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THE LANCET

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LINCTUS

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- Depresses the activity of the cough centre.

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- All forms of dry, unproductive cough.

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- Completely non-toxic.
- No constipation.
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Adults 1 or 2 teaspoonfuls 4 times daily.
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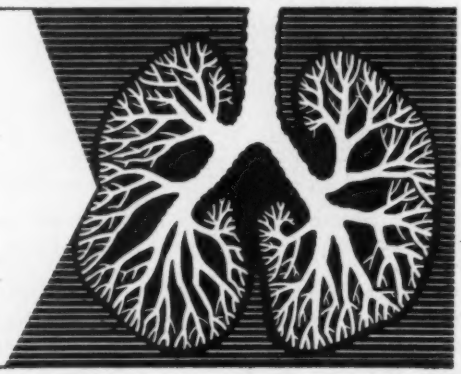
Medical Department
THE BRITISH DRUG HOUSES LTD. LONDON N.1

IMMEDIATE
CONTROL OF
ASTHMA



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. . . to maintain the blood sugar

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Tartaric Acid 11.1
Chloramine B.P. 1.1
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The Family Planning Association advise that for maximum safety, any chemical contraceptive should be used with a mechanical barrier.

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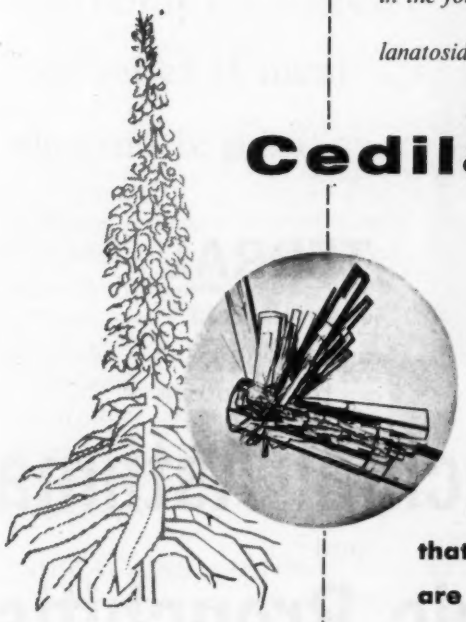
in the form of the pure crystalline cardiac glycoside

lanatoside C—



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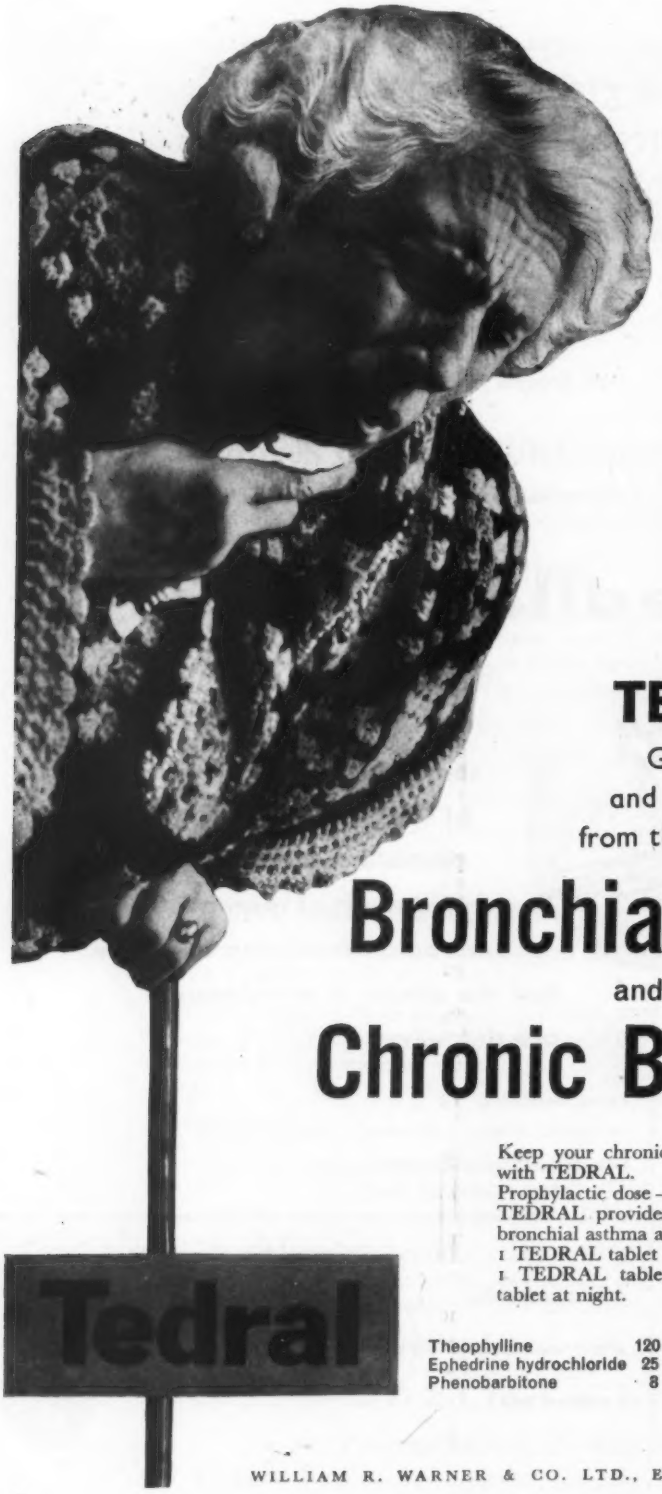

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Keep your chronic bronchitic patients up and about with TEDRAL.
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Algesal

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E.G.H. LABS

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★ Tear-off pads of leaflets describing a rational home treatment and simple exercises for osteoarthritis of the knee are available for handing to patients. Other leaflets dealing with lumbo-sacral strain and frozen shoulder are also available. Further leaflets are in preparation.

A NEW APPROACH TO WOUND HEALING

The use of STABILIZED TRYPSIN in the treatment of

WOUNDS

ABRASIONS

BURNS

ULCERS etc.

IT HAS LONG BEEN KNOWN that the proteolytic enzyme Trypsin could resolve necrotic tissue and was in theory an ideal physiological agent for the treatment of infected wounds. Its instability has, however, until recently precluded its use for this purpose. Lloyd-Hamol of London and Zurich have now succeeded in producing a cream, Biotrase, in which trypsin remains physiologically active for over a year.

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Biotrase is in 35 gram tubes at a basic N.H.S. price of 3/9d.

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Samples and literature gladly sent on request

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*** Ready prepared**

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*** Palatable**

Contains 60 mg. Penicillin V
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in cases of fibrositis

for greater penetration and longer lasting warmth

FINALGON, a powerful rubefacient of unique formulation, will relieve pain associated with fibrositis quickly and effectively. Its action is neuro-vascular, producing a dilation of the capillaries with a rise in skin temperature. The feeling of warmth thus produced is lasting and pain is rapidly eased. FINALGON is non-staining, pleasantly perfumed, and is supplied with a free patent applicator.

FINALGON*

Nonylic acid vanillylamide (2.5%) with the β butoxyethyl ester of Nicotinic acid (0.1%)

Manufactured and distributed in the U.K. by Pfizer, Ltd., Folkestone, Kent, for
C. H. Boehringer Sohn, Ingelheim am Rhein.
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The angina patient goes to bed in fear and may wake in agony. Peritrate prophylaxis can ease his mind considerably. Since Peritrate is a *long-lasting* coronary vasodilator, a single dose affords protection for as long as 4 to 5 hours . . . a considerable part of the night. Peritrate will not abort attacks completely — but it prevents attacks or reduces their severity in up to 80% of cases. Exercise tolerance is increased, nitroglycerin intake is reduced and very few side-effects occur.

Active principles: Pentaerythritol tetranitrate 10 mg.

Packing: Bottles of 50 tablets and packs of 500 supplied to chemists for dispensing only.

PERITRATE WITH PHENOBARBITONE (Peritrate 10 mg. with Phenobarbitone 15 mg.) is also available, similarly packed.

Peritrate

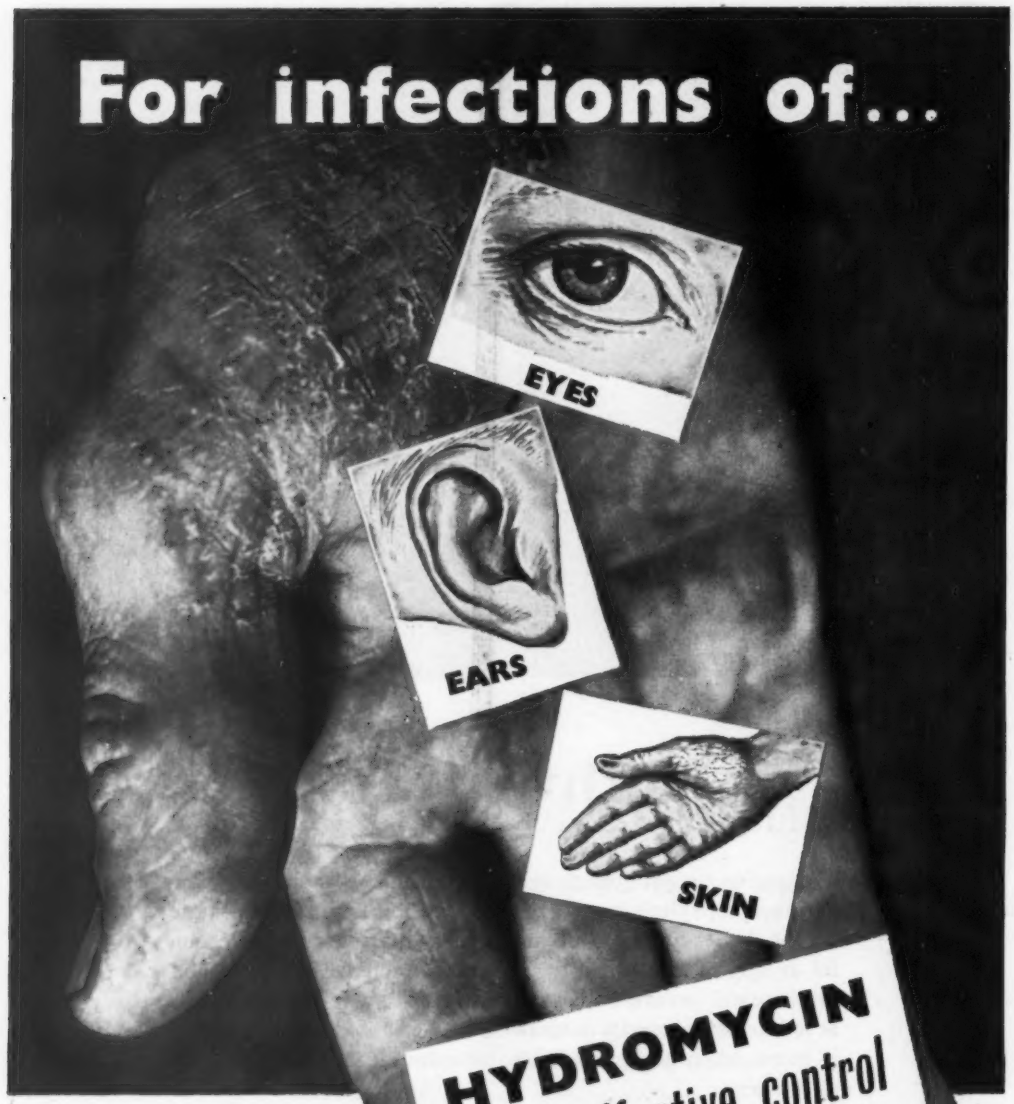
Trade Mark

WARNER

WILLIAM R. WARNER & CO. LTD., LONDON and EASTLEIGH

PBR 577/4

For infections of...



HYDROMYCIN gives effective control

HYDROMYCIN—a combination of hydrocortisone and neomycin for prompt and effective control of both inflammation and infection.

SAFE · EFFECTIVE
PROMPT IN ACTION · WELL TOLERATED

HYDROMYCIN

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1% Tubes of 5 and 15 G.
EAR/EYE OINTMENT
1.5% Tubes of 3 G.
EAR/EYE DROPS
1.5% Bottles of 5 c.c.

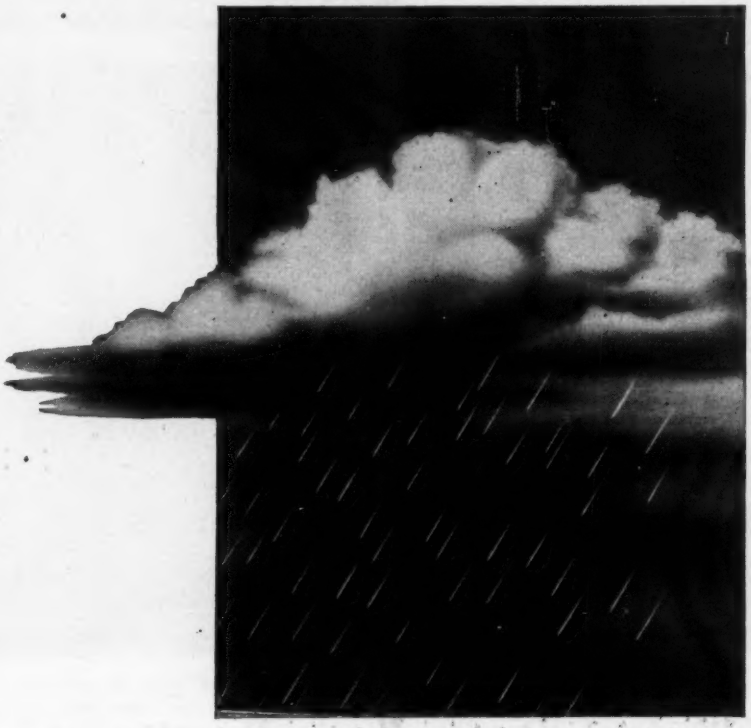
Literature and further information gladly sent on request.

BOOTS PURE DRUG COMPANY LIMITED · NOTTINGHAM · ENGLAND

Boots

10

S308



RELEASING the surplus

In cardiac oedema and other conditions where excess fluid accumulates in the tissues, DIAMOX acetazolamide can be relied upon to release the surplus promptly and safely. DIAMOX induces diuresis in a novel and highly efficient manner—by inhibiting the enzyme carbonic anhydrase. A single dose will induce a powerful diuretic response, persisting for six to twelve hours—and in many cases of congestive heart failure DIAMOX *alone* is capable of maintaining the patient oedema-free. As clinical experience of DIAMOX grows, more and more applications are revealed—including glaucoma, toxaemias and oedema of pregnancy, epilepsy and premenstrual tension. DIAMOX has also been used in emphysema, drug-induced oedema, renal oedema and obesity.

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* REGD. TRADE MARK ACETAZOLAMIDE

TABLETS (250 mg.): bottles of 25, 100 and 1,000
PARENTERAL: vials of 500 mg.

Lederle

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PRO-BANTHINE* IN ULCER HEALING

FIG. 1. "*But X-ray study at this time still revealed the ulcer niche.*"

FIG. 2. *In ten weeks "the niche was no longer visible radiologically or gastroscopically."*

Clinical Report on Pro-Banthine

The case-history below of ulcer on the gastric side of gastro-jejunal stoma reveals significantly the high potency in low dosage of the well-tolerated anti-cholinergic agent, Pro-Banthine.

M. D., female, age 48, had a posterior gastro-jejunostomy fourteen years previously for duodenal ulcer. Nine months prior to her first visit severe intractable pain recurred and a subtotal gastrectomy was performed at another hospital. She remained well for a few months and then because of recurrence of severe pain and marked weight loss, she was referred for treatment. X-ray study revealed a large ulcer niche on the gastric side of the anastomosis. Antacids and sedatives gave no relief from pain. She was given 45 mg. of Pro-Banthine four times a day and within seventy-two hours was able to sleep through the night for the first time in weeks. After two weeks of Pro-Banthine treatment the patient felt completely well, but X-ray study at this time still revealed the ulcer niche (Fig. 1). After a further ten weeks' treatment the niche was no longer visible radiologically or gastroscopically (Fig. 2). In the five months prior to the report she was maintained on 30 mg. of Pro-Banthine four times daily without any recurrence of symptoms.

Pro-Banthine is the safe, potent anti-cholinergic agent which effectively controls excessive parasympathetic activity in the gastro-intestinal and genito-urinary tracts.

Pro-Banthine tablets containing 15 mg. of propantheline bromide are available in bottles of 40, 100 and 1000 tablets.

Parenteral Pro-Banthine is available in vials containing 30 mg. of propantheline bromide as a dry sterile powder, in boxes of 6 and 25 vials, for injection where needed.

Pro-Banthine with phenobarbitone tablets (15 mg. of each) are available in bottles of 40, 100 and 1000 tablets. G. D. Searle and Co. Ltd., High Wycombe, Bucks. Telephone : High Wycombe 1770.

* *Registered Trade Mark*

SEARLE

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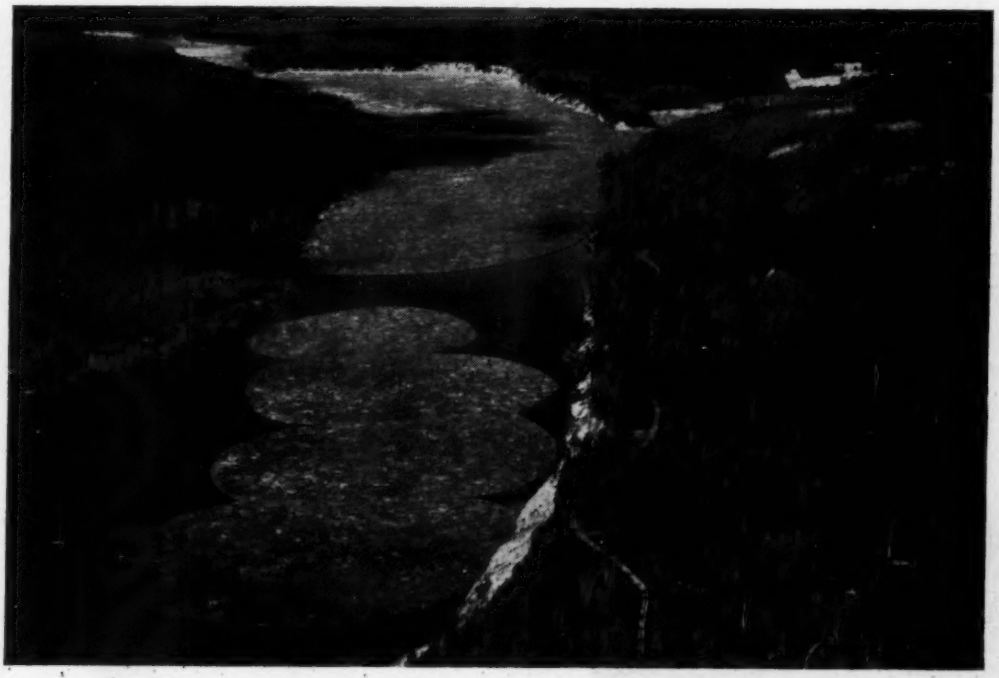

Circular booms or "sacks" each consisting of about 25,000 logs, on the Gatineau River, Quebec, one of Canada's richest sources of pulp wood. (*Photograph by courtesy of the National Film Board of Canada.*)

–but when blood vessels are occluded...

ANTICOAGULANT THERAPY

with

PULARIN* and **DINDEVAN***

Heparin-Evans. Phenindione-Evans

PRESENTATIONS.

PULARIN (Heparin-Evans) 5 ml. rubber capped bottles containing 1,000 i.u., 5,000 i.u. and 25,000 i.u. per ml.; ampoules of 1 ml., 12,500 i.u. per ml.

DINDEVAN (Phenindione-Evans) Tablets of 10 mg. and 50 mg.

Further information gladly supplied by the Medical Information Department

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EVANS MEDICAL

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now have available
ASIAN INFLUENZA VACCINE
for general prescription

This material is the original vaccine developed by Dr. Himmelweit of the Wright-Fleming Institute of Microbiology, using Influenza Virus A/Singapore/1/57, as supplied to Ministry of Health requirements.

available in ampoules of 1 c.c. and vials of 10 c.c.

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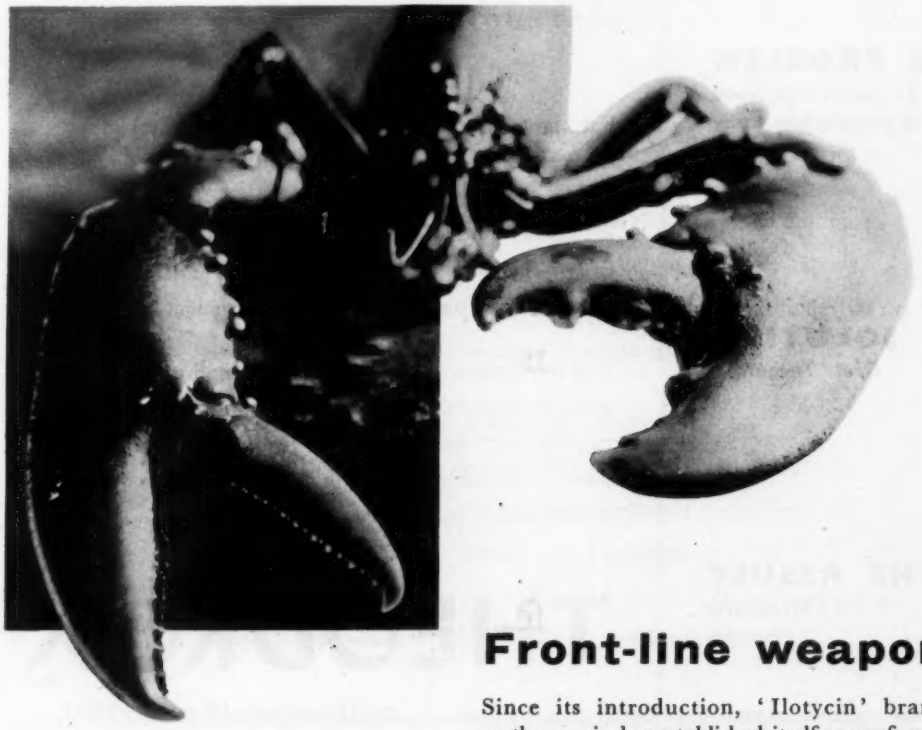

Front-line weapon

Since its introduction, 'Ilotycin' brand erythromycin has established itself as a safe and potent oral antibiotic. Clinical experience has shown that it can play a vital part as a front-line weapon against a wide range of infections. 'Ilotycin' has a penicillin-like antibacterial spectrum, is powerfully bactericidal, has negligible effect on the normal intestinal flora, and is fully effective by mouth. It has accordingly become the logical first choice after penicillin in the treatment of common infections.

The average daily dose is 1 Gm. increased in severe infections.

'Ilotycin' is available as Tablets of 100 mg. and 250 mg.; also as 'Ilotycin' Paediatric and as 'Ilotycin Glucoheptonate' Intravenous.

'ILOTYCIN'

THE ORIGINAL ERYTHROMYCIN

DISCOVERED BY *Lilly*

ELI LILLY & COMPANY LIMITED · BASINGSTOKE · ENGLAND

15

THE PROBLEM
To obtain high blood levels of theophylline easily . . .

For oral aminophylline therapy to be fully effective it is necessary to give a dose sufficient to produce high blood theophylline levels. However, because of gastric irritation vomiting often results. Alternative therapy with enteric coated tablets or suppositories is unreliable, and parenteral aminophylline is inconvenient.

THE SOLUTION
Oral 'Theodrox' . . .

The combination of dried aluminium hydroxide gel and aminophylline in 'Theodrox' ensures full therapeutic response with the minimum of gastric upset. Reproduceable blood levels comparable with those obtained from intramuscular injection can be obtained.

THE RESULT
A full Therapeutic response . . .

THEODROX
REGD.

Recent work[1,2] has shown that synthetic derivatives of theophylline are mostly unsatisfactory and all are more expensive.

Each 'Theodrox' tablet contains 3 grains aminophylline and 4 grains dried aluminium hydroxide gel. 'Theodrox' is also available combined with $\frac{1}{8}$ grain phenobarbitone where a degree of sedation is also required.

REFERENCES

1. *Brit. Med. J.* (1957) *2*: 67
2. *Ibid.*, page 74

DOSAGE . . .

ASTHMA:— two tablets, repeated in 2-3 hours if necessary to control paroxysm and dyspnœa. For prophylaxis, one tablet 4 times daily.

DIURETIC:— two tablets initially, then one or two tablets three times daily.

ANGINA PECTORIS:— four to eight tablets daily. In suitable cases 'Theodrox' with Phenobarbitone tablets can replace some or all of the 'Theodrox'.

PACKS:— Bottles of 25, 100 and 1,000 tablets.

RIKER

'Theodrox' (Brit. Pat. 727831) is a registered Trade Mark of

RIKER LABORATORIES LIMITED
LOUGHBOROUGH LEICS.

In the treatment of migraine . . .

* **Femergin**

TABLETS
1 mg. Ergotamine Tartrate B.P.

AMPOULES
0.5 mg. Ergotamine Tartrate B.P./ml.

Cafergot

TABLETS
1 mg. Ergotamine Tartrate B.P.
100 mg. Caffeine B.P.

SUPPOSITORIES
2 mg. Ergotamine Tartrate B.P.
100 mg. Caffeine B.P.
0.25 mg. total alkaloids of belladonna
100 mg. isobutylallyl barbituric acid

Dihydroergotamine

SOLUTION
2 mg. dihydroergotamine methanesulphonate/ml.

AMPOULES
1 mg. dihydroergotamine methanesulphonate/ml.

"If ergotamine tartrate
by itself is not effective,
it may be more effective when combined
with caffeine, such as Cafergot tablets
(ergotamine tartrate 1 mg., caffeine 100 mg.)
or rectal suppositories . . .

If Cafergot tablets
and rectal suppositories are used
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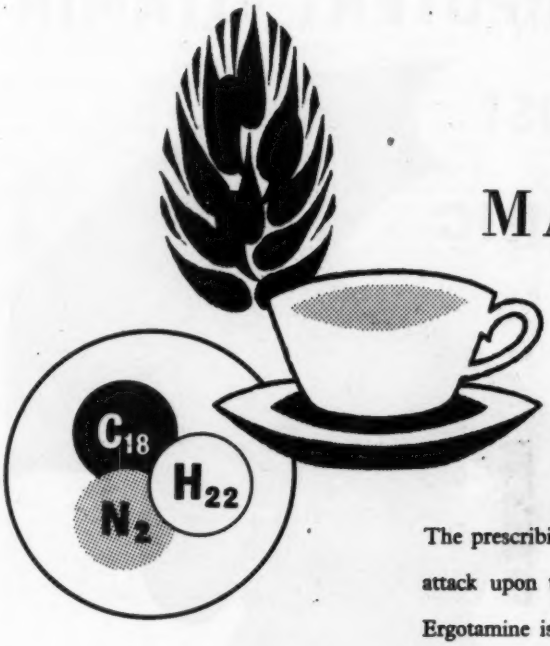

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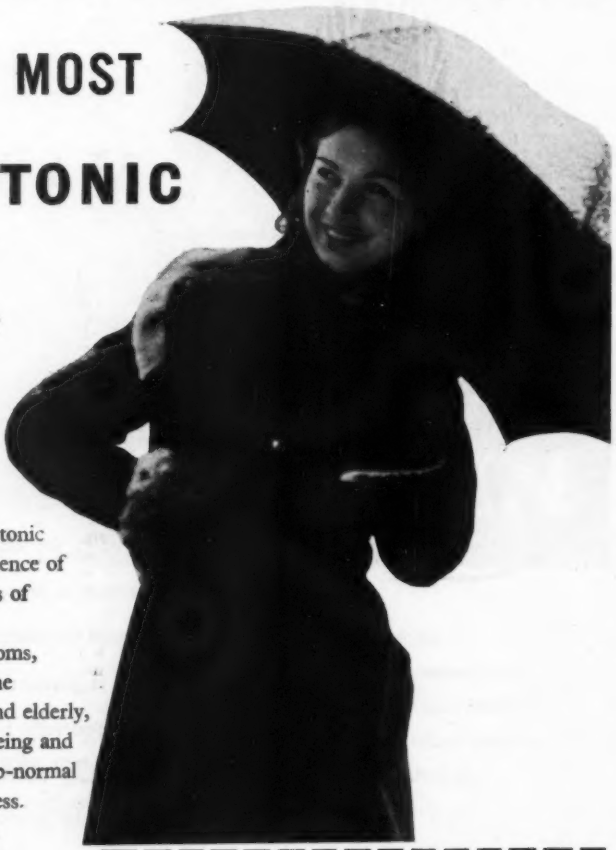

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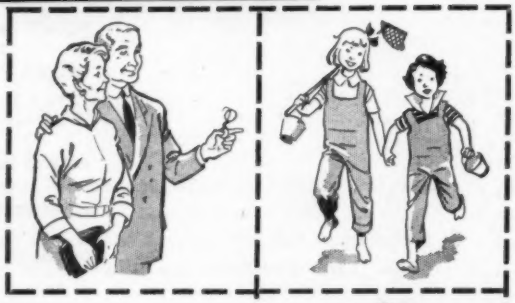

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RENAL EXCRETION OF WATER AND SALT *

E. B. VERNEY
M.A., M.B. Cantab., F.R.C.P., F.R.S.
SHEILD PROFESSOR OF PHARMACOLOGY IN THE UNIVERSITY OF CAMBRIDGE

THE facultative excretion of water and its mode of control—i.e., the processes which underlie the diuresis response of the living mammal to the ingestion of water—and the contemporary excretion of electrolytes first interested me when the late Professor Starling and I showed that when the isolated kidney of a dog was perfused with blood it secreted a profuse watery urine, and that this diuresis was inhibited by the addition of posterior-pituitary extract to the perfusing blood, the inhibition being accompanied by an increase both in the concentration of chloride in the urine and in the rate of excretion of chloride (Verney and Starling 1922, Starling and Verney 1925). We suggested then that some substance with an action similar to that of posterior-pituitary extract was normally present in the intact mammal and controlled the kidney in its important function of regulating the output of water and of chloride.

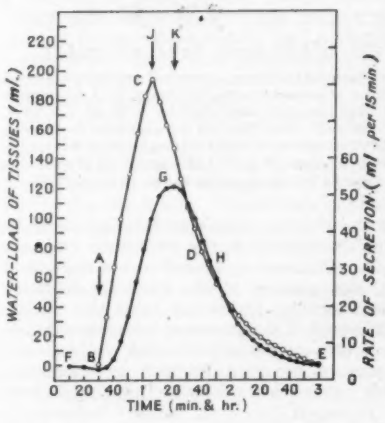

Fig. 1—Lag between peak of water load and peak rate of urine flow: Water 250 ml. was given at A; B, C, D, E, course of the water-load (mean of nine animals); F, B, G, H, E, mean rate of secretion (mean of same nine animals); interval J–K between peak of water load and the peak rate of urine secretion is 15 minutes (Klisiecki et al. 1933a).

Fortunately the ostensibly simple phenomenon of water diuresis appears, at least in a form susceptible to quantitative analysis, only when the animal is in living correspondence with its external and internal environments and unbenumbed by that state of anæsthesia which, in ministering to technique, frustrates or embarrasses interpretation.

Relation of Absorption to Excretion of Water

Under controlled conditions the diuretic responses of a healthy bitch to a fixed dose of water are fairly uniform; and one of the earliest findings in the analysis of the response (one that clearly showed that the phenomenon was less simple than at first sight it appeared to be) was that the course of the absorption of water from the gut was well in advance of that of the excretion of water by the kidney (fig. 1). If then, as is reasonable, we regard the water-load curve as tracing the intensity of the stimulus to which the kidney is ultimately responding, we must conclude that there is a definite time-lag between the greatest intensity of the stimulus and the greatest response by the kidney.

Inhibition of Established Diuresis

Now, this diuresis response may, after its establishment, be inhibited by various agents. It had been known for many years that exercise and emotional factors may produce a decrease in urine flow, a decrease that was implicitly or explicitly attributed to a vasomotor source.

Klisiecki et al. (1933b), however, observed some twenty years ago that, when a dog whose left splanchnic nerves had been divided and ureters exteriorised was exposed to a cat during water diuresis, the rate of urine flow temporarily fell about equally on both sides.

Theobald (1934) showed that, in the dog, stimulation of the afferent nerves produced, during water diuresis, an inhibition whose course was of the pituitary type.

Rydin and Verney (1938) found that when dogs were subjected, during an established water-diuresis, to brief periods

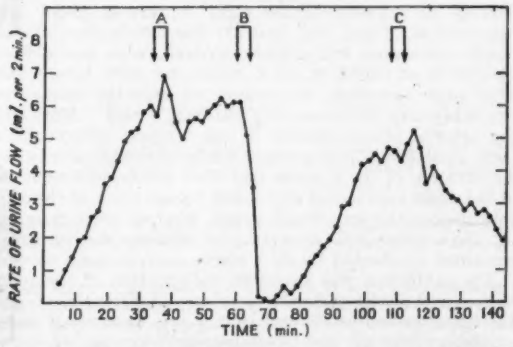

Fig. 2—Water 250 ml. was given at zero time: during periods A and C bitch ran on moving platform quite happily; during period B same exercise was given and bitch was disturbed by repeated sounding of car-horn (Rydin and Verney 1938).

of muscular exercise—e.g., running on a moving platform at 6 m.p.h. for four minutes—there usually followed a well-marked and protracted inhibition of urine flow. Analysis of this response showed it to be due to the emotional accompaniment of the exercise; for, if the dogs were repeatedly exercised under these conditions, the inhibitory responses progressively diminished to final extinction. Further, if the exercise, to which response had been extinguished by repetition, were combined with an unfamiliar and ugly sound, the inhibitory response reappeared.

In the experiment charted in fig. 2 the dog was subjected to three similar periods of exercise with which it had become familiar (A, B, and C); but, whereas during A and C the exercise was simple, during B it was combined with the repeated sounding of a car-horn, and to this the animal exhibited fright. There can be no question, therefore, that the

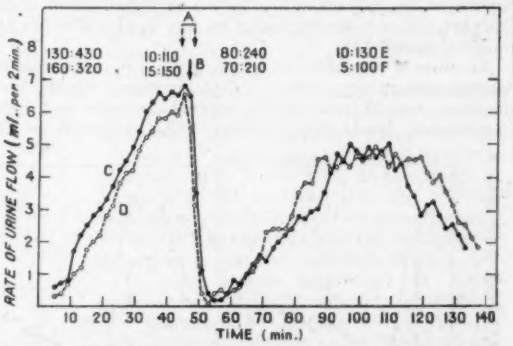

Fig. 3—Water-diuresis curves from bitch: curve C obtained on Nov. 21, curve D on Nov. 25, 1935; kidneys had been denervated on Oct. 14, right suprarenal gland removed and the left denervated on Nov. 15. At B, during course of C, 5 × 10⁻⁴ ml. of posterior-pituitary extract (10 U per ml.) was injected intravenously. At A, during course of D, bitch was angered by noise. E, chloride (as NaCl) in mg. per 100 ml. of urine, and nitrogen in mg. per 100 ml. urine, at four periods during course of C; F, corresponding figures during course of D (Rydin and Verney 1938).

* The Bertram Louis Abrahams lecture delivered at the Royal College of Physicians of London on July 8, 1954.

inhibitory response that began during B was due not to the exercise but to its emotional accompaniment.

In later work, therefore, emotional stress was produced by carrying a weak faradic current to the subcutaneous tissues through surgically clean needle electrodes and increasing its strength until the dog showed resentment; and experiments were undertaken to determine the essential cause of the resultant fall in the rate of excretion of water by the kidney.

Mechanism of Inhibition

Serial operations comprising (1) division of the renal nerves, (2) removal of the right suprarenal gland and denervation of the left, and (3) decentralisation of the whole abdominal sympathetic system, with removal of ganglia LI–SI inclusive, were found, by tests before and after each operation, to produce no essential change in the inhibitory response to emotional stress. Moreover the arterial blood-pressure in the femoral artery under local anæsthesia during these inhibitory responses, after denervation of the kidneys and after subsequent removal of the right suprarenal gland and denervation of the left, rose during the emotional stress, whereas after removal of the abdominal sympathetic chains the pressure remained unaffected by such stress.

The inhibition was therefore independent of the renal nerves and of the endogenous release of adrenaline; and the blood-pressures showed that it was apparently independent, too, of any contemporary change in renal blood-flow.

Posterior-pituitary Antidiuretic Substance

It therefore seemed likely that the humoral agent released by the stress and directly responsible for the inhibition of urine flow was posterior-pituitary antidiuretic substance; and this view was supported by the minuteness of the minimal effective dose of this substance; by the presence of a suitable structural basis for the emotional release in the innervation of the pars nervosa of the pituitary gland by fibres from the supraoptic and paraventricular groups of hypothalamic nuclei; by Pickford's (1939) demonstration of the release of posterior-pituitary antidiuretic substance by acetylcholine in the atropinised dog; and by the similarity both in lag in onset and in external form between the inhibitory responses to intravenously administered posterior-pituitary extract and those to emotional stress, the responses becoming, with a suitable dose of extract, indistinguishable (fig. 3). Furthermore the antidiuretic action of the extract is unaffected by denervation of the kidneys and is unaccompanied by any appreciable change in renal blood-flow.

So close a resemblance between the two responses (to posterior-pituitary extract and to emotional stress), both in form and in measurable accompaniments and independencies, made one confident that removal of the

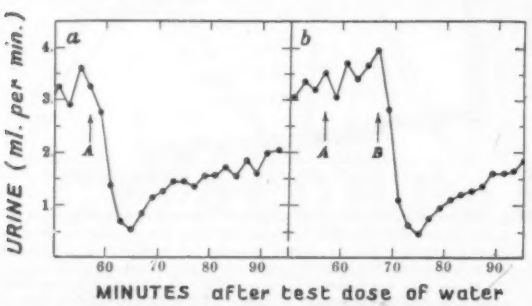

Fig. 4—"Alice": *a*, at A, injection of 10·5 ml. of 0·26 M NaCl into left carotid artery in 9 sec.; *b*, at A, injection of 2 ml. of 0·26 M NaCl into right carotid artery in 7 sec. and, at B, injection of 11 ml. of same solution into right carotid artery in 13 sec. (Verney 1947).

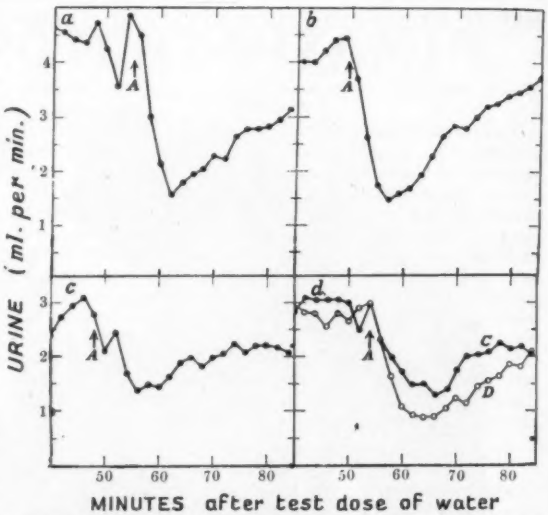

Fig. 5—"Sally's" responses to injections: *a* and *b*, 5 days before, *c* and *d* 11 days after, removal of posterior lobe of pituitary. *a*, at A, injection of 21 ml. of 0·43 M NaCl into right carotid artery in 20 sec.; *b*, at A, posterior pituitary extract 1 mU injected intravenously in 15 sec.; *c*, at A, injection of 21 ml. of 0·43 M NaCl into right carotid artery in 20 sec.; *d*, at A, 0·1 mU (graph C) and 0·2 mU (graph D) of posterior-pituitary extract injected intravenously in 20 sec. (Verney 1947).

posterior lobe of the pituitary gland in the dog would be followed by a big diminution in the inhibitory response to emotional stress. This was confirmed by O'Connor and Verney (1942). Comparison of the posterior-pituitary extract equivalent of the emotional inhibition before with that after removal of the posterior lobe showed that only about 5% of the antidiuretic function of the neurohypophysis, expressed in the inhibition by emotional stress, remained when the posterior lobe had been removed.

While these investigations of water diuresis were in progress, evidence had gradually been accumulating that the polyuria often associated with either experimental or pathological lesions of the pituitary gland and the hypothalamus was to be ascribed rather to lack of posterior-pituitary antidiuretic substance than to Schäfer and Magnus' (1901) diuretic substance.

That evidence culminated in the elegant demonstration by Ranson et al. (1938) that, in the cat and the monkey, the occurrence of diabetes insipidus was contingent on the complete or quasi-complete degeneration or removal of the neurohypophysis. This work showed that the animal's ability to conserve its tissue water depended on the continuous secretion of posterior-pituitary antidiuretic substance, and the effects of emotional stress showed that the release of this substance could be varied by an appropriate stimulus in the healthy animal.

Osmotic Pressure of Arterial Blood

These observations, coupled with the fact that the release may be caused by such mild disturbance of the central nervous system as comes within a physiological range—even the anticipation of a nocuous stimulus which the animal has previously experienced may be effective—encouraged an attempt to determine whether the secretion of this substance were not continuously varying with, and under the direct control of, some factor in the animal's internal environment, to the maintenance of which factor within a narrow physiological range the renal secretion of water and of chloride would specifically contribute.

Such a factor is clearly the osmotic pressure of the arterial blood. Indeed, the hypothesis that water diuresis

is conditioned by an inhibition of secretion of antidiuretic substance by the neurohypophysis implies a prior governance of this secretion by the osmotic pressure of the arterial blood. A fall in this osmotic pressure will inevitably accompany the increased water load of the animal after water administration—such a fall was demonstrated in venous blood by Baldes and Smirk (1934); and indeed as long ago as 1916 Haldane and Priestley postulated that, in water diuresis, the kidney was responding directly to an increase in the ratio of water molecules to total molecules in the plasma —the "diffusion-pressure of water"—and they drew an analogy between such sensitiveness of the kidney to the pressure of water molecules in the plasma and that of the respiratory centre to the partial pressure of carbon dioxide.

In view of the more recent work, however, it seemed more likely that a change in osmotic pressure—if, indeed, this were the primarily effective factor in the sequence of underlying events—would be operating through the intermediation of the neurohypophysis, and it thus became of interest and importance to put such hypothesis to the test of experiment. As we shall see, the determining osmotic pressure of the plasma is not the total pressure conceived physically and measured in vitro but derives from the specific permeability of a living membrane to each of the plasma solutes to which it is exposed.

For these experiments healthy bitches were perineotomised to make catheterisation of the bladder simple and undisturbing. After healing was complete, a "carotid loop" (van Leersum 1911) was made on one side, followed after a suitable interval by the formation of a similar loop on the other side. These loops enabled the injection or infusion of a chosen solution to be made directly and painlessly into the common-carotid blood during an established water diuresis in the living animal.

Preliminary observations showed that the intracarotid injection of isotonic solutions and the intravenous injection of hypertonic solutions (e.g., 0·33*M* NaCl) produced no immediate effect on the flow of urine. The injections were made at a rate of 1 ml. per sec. for 20 sec. and as uniformly as possible with the aid of a beating metronome. When, however, hypertonic solutions of

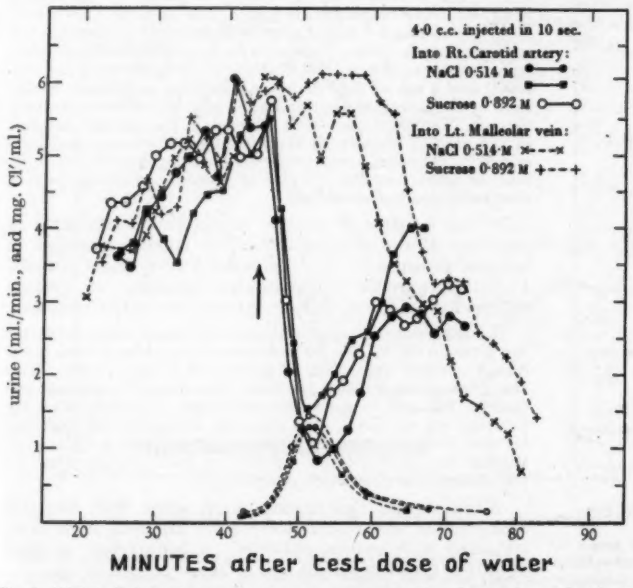
4·0 c.c. injected in 10 sec.
Into Rt. Carotid artery:
NaCl 0·514 M
Sucrose 0·892 M
Into Lt. Malleolar vein:
NaCl 0·514 M
Sucrose 0·892 M
urine (ml./min., and mg. Cl⁻/ml.)
MINUTES after test dose of water

Fig. 6—"Nicky": injections made at arrow; corresponding changes in urine chloride are given by curves at bottom of figure (Verney 1947).

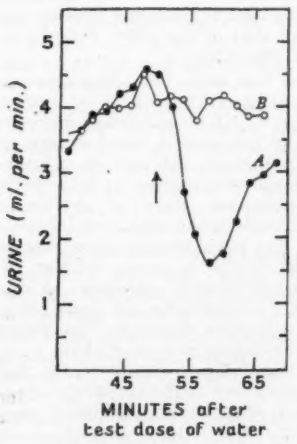

Fig. 7

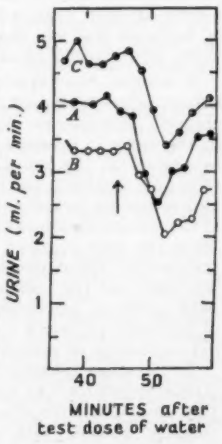

Fig. 8

Fig. 7—"Nicky": at arrow were injected into right carotid artery 4·0 ml. of 0·514 *M* NaCl in 10 sec. (graph A) and 4·0 ml. of 1·35 *M* ethanol in 10 sec. (graph B) (Verney 1954).

Fig. 8—"Nicky": at arrow were injected in 10 sec. 4·0 ml. of 0·514 *M* NaCl intravenously (graph A) 4·0 ml. 0·67 *M* ethanol into right carotid artery (graph B), and 4·0 ml. of 0·67 *M* urea into right carotid artery (graph C), each injection containing 0·5 mU of posterior-pituitary extract (Verney 1954).

chloride were injected into the carotid artery, definite inhibitory responses were observed. Two such responses are illustrated in fig. 4. The magnitude of the responses varied with the tonicity of the solution at constant rate and period of injection and with the period of the injection at constant volume and tonicity of solution.

These responses simulated so closely the response to the intravenous injection of posterior-pituitary extract that it appeared highly probable that they were of pituitary origin. This was put to the test of experiment by measuring the response to a given injection before and after removal of the posterior lobe. Fig. 5 shows that the response to 21 ml. of 2·50% NaCl injected into the right carotid artery in 20 sec. five days before removal of the posterior lobe equated closely with the response to 1 mU of posterior-pituitary extract injected intravenously; and that the response to the same intracarotid injection eleven days after removal of the posterior lobe was very much smaller.

It is therefore valid to assay the responses in terms of posterior-pituitary extract; and, when this is done, it is found that the response to a given intracarotid injection is diminished by about 90% as the result of removal of the posterior lobe (fig. 5). No difference was detected between the response to an intravenous and that to an intracarotid injection of posterior-pituitary extract.

It now became important to know whether the sodium chloride, in eliciting the responses to intracarotid injections, was acting specifically or by virtue of the increase which it produced in the osmotic pressure of the plasma. To this end equal increases in the osmotic pressure of the carotid blood were produced by injections of sodium chloride, sodium sulphate, dextrose, and urea. Whereas the responses to sodium chloride and sodium sulphate were

indistinguishable, the response to dextrose was seemingly a little smaller, suggesting that the osmotic effectiveness of dextrose was less than that of the other two solutes. Urea, on the other hand, was inactive.

A similar comparison was then made between the effects of osmotically identical injections of sodium chloride and sucrose (fig. 6). The calculated increases in the osmotic pressure of the carotid blood during the injections of the sodium-chloride and sucrose solutions were 52% and 53%. The response to sucrose lay between the two responses to sodium chloride. Moreover, the courses of the concentration of chloride in the urine were identical. Since the only common and equal change in property of the carotid blood caused by the injection of these two solutions was the increase in osmotic pressure, and since both solutions produced quantitatively the same release of posterior-pituitary antidiuretic substance, the osmotic determination of the phenomenon is beyond cavil.

It therefore became justifiable to introduce the term " osmoreceptors " as descriptive of the autonomic receptive elements with which the neurohypophysis is functionally linked, and through whose activation the pituitary antidiuretic substance is released. The term was, of course, introduced without prejudice to any specific permeability which the receptors might be shown to exhibit to their molecular environment; and the facts so far presented show that, when the receptors are exposed to short-lived (about 10 sec.) and relatively large (50–100%) increases in the osmotic pressure of their environment, their " membrane " is relatively impermeable to sodium chloride, sodium sulphate, and sucrose, and less impermeable to dextrose, but freely permeable to urea.

More recently I have tested the permeability of the " membrane " to ethanol and found that this, just like urea, passes freely through it. Fig. 7 shows the effects of injecting into the carotid artery in 10 sec. 4 ml. of 0·514 *M* NaCl and 4 ml. of 1·35 *M* ethanol, the latter dissolved in isotonic NaCl. Whereas the hypertonic sodium-chloride solution produced a well-marked inhibition of urine flow, the ethanol solution had no effect, in spite of the fact that the calculated local increase in the osmotic pressure of the carotid blood was, with the ethanol injection, more than double that with the sodium chloride injection (104·1% and 51·3% respectively).

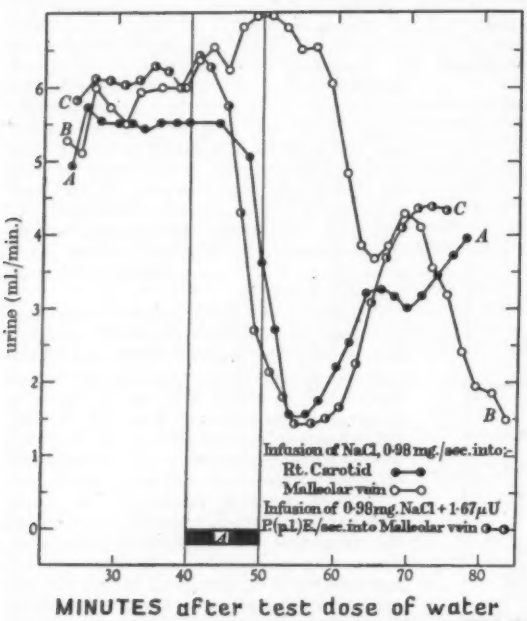

Fig. 9—" Nicky ": rectangle A covers period of infusions; graph A, response to intracarotid infusion; graph B, response to intravenous infusion; graph C, response to intravenous infusion + posterior-pituitary extract 1·67 μU per sec.; solution infused was 0·93 M NaCl at 1·08 ml. per min. (Verney 1947).

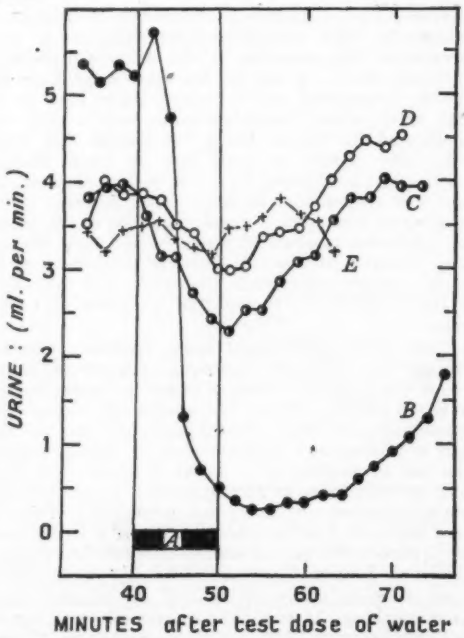

Fig. 10—" Nicky ": rectangle A covers period of infusions; graphs B and C, responses to infusions: into right carotid artery at 1·08 ml. per min. of 0·93 M NaCl (graph B) and 1·47 M dextrose anhyd. (graph C); graph D, response to same infusion of dextrose given intravenously; graph E, absence of response when the intracarotid infusion was 1,41M ethanol in 0·85% NaCl. (Verney 1954).

That the difference in the effects of these two solutes was not due to suppression, by the ethanol, of the action of released antidiuretic substance on the kidney is shown by the results in fig. 8. Three responses are given: one to 4 ml. of 0·514 *M* NaCl containing 0·5 mU of posterior-pituitary extract injected intravenously in 10 sec.; and two to the intracarotid injection, again in 10 sec., of 4 ml. of 0·67 *M* ethanol (dissolved in isotonic NaCl) and 4 ml. of 0·67 *M* urea (dissolved in isotonic NaCl), each of the solutions containing 0·5 mU of posterior-pituitary extract. The calculated local increase in the osmotic pressure of the carotid blood with the injections of ethanol and urea was 51%. The three responses were indistinguishable, all being due, of course, to the 0·5 mU of posterior-pituitary extract that each solution contained.

It then became of interest to determine the effect of exposure of the receptors to much smaller increases in osmotic pressure (1–5%) maintained over longer periods. For this purpose intravascular infusions of various solutes were made at uniform rates in 10 and in 40 minutes.

Typical results of such 10-minute infusions of sodium chloride are given in fig. 9. For 10 minutes sodium chloride was introduced into the circulation at the rate of 1 mg. per sec. With the intracarotid infusion the urine flow showed a gradual and definite fall, and began to recover about 5 minutes after the infusion was stopped. This response was fairly well matched by that to the intravenous infusion of the same solution containing posterior-pituitary extract of such amount that 1·7 μU entered the circulation every second.

When similar experiments were made with dextrose and ethanol, the results were quite different from those obtained with sodium chloride. A comparison of these results is given in fig. 10.

The intracarotid infusions in each case were such that the local increase in osmotic pressure of the carotid blood was

calculated to be 4·7–4·9%. With sodium chloride there was a large inhibition of urine flow; with dextrose the inhibition was very much smaller; with ethanol there was no change in the diuretic flow of urine; and intravenous dextrose produced a small inhibition, smaller than that from the intracarotid infusion, and this I suspect to be due to the release of insulin. It was not seen in comparable experiments with fructose. With sucrose, on the other hand, the effects of intracarotid infusions were indistinguishable from those of osmotically equal infusions of sodium chloride.

The results of these experiments confirm the previous conclusion that the "membrane" of the osmoreceptors is relatively impermeable to sodium chloride and sucrose, less impermeable to dextrose, and freely permeable to urea and ethanol. Each comparison of the effects of these solutes was, of course, made on the same animal.

Now, when water is given to the dog in the dosage used in these experiments (about 2% of the body-weight) and the percentage (W/W) of water in the arterial blood is followed by serial sampling of the carotid blood, there is an increase of about 1% within 12 minutes of giving the water. If, therefore, the corresponding fall in osmotic pressure effectively suppresses the secretion of posterior-pituitary antidiuretic substance, one might expect that, when the water diuresis is established, a prolonged unilateral intracarotid infusion, calculated to maintain a local increase of about 2% in the osmotic pressure of the blood, would produce a course of antidiuresis which was roughly the inverse of that of diuresis following the test dose of water. With these considerations in mind we turn to a description of experiments in which such increase in osmotic pressure was maintained for 40 minutes.

Experiments of this kind were made with sucrose, dextrose, and sodium chloride. When, during an established water diuresis, sucrose was infused into a common carotid artery for 40 minutes and at such a rate that the calculated local increase in osmotic pressure was a little less than 2%, the urine flow, after a latent period of about 5 minutes, began to fall and continued to do so until the flow was about 10% of the original diuretic rate. After the infusion was stopped, the urine flow began to increase again.

The same infusion given intravenously had no such antidiuretic action; but, when to such intravenous infusion posterior-pituitary extract was added in such amount that about 1·2 μU per sec. entered the circulation, there was an inhibition of urine flow, whose course followed closely that produced by the intracarotid infusion of sucrose alone.

When, however, exactly comparable experiments were made with dextrose, a quite different result was seen, in that no difference was detectable between the effects of the intracarotid and those of the intravenous infusions. With the intracarotid infusions of dextrose the local increase in the dextrose content of the blood was about 90 mg. per 100 ml. The conclusion is justified, therefore, that the "membrane" of the osmoreceptors is permeable to dextrose to such degree that a rise in its concentration by about 90 mg. per 100 ml.—a rise which is within the human pathological range—does not elicit an antidiuretic secretory response by the neurohypophysis. Indeed, were this not so, patients with diabetes mellitus would be in a very awkward position.

When comparable experiments were made with sodium chloride, the results were very similar to those with sucrose. Fig. 1Γ shows the results in one such series of experiments. With the intracarotid infusion the urine flow, after a latent period of about 10 minutes, began to fall; it reached the low rate of 0·5 ml. per minute about 20 minutes later; and, soon after the infusion had been stopped, the urine flow progressively recovered. The intravenous infusion, on the other hand, had no appreciable influence on the course of the diuresis.

The remaining graphs in fig. 11 show the courses of urine flow when to the intravenous infusion was added posterior-pituitary extract in increasing quantities to assay the response to the intracarotid infusion. This last response lies, for most of its course, between the responses to 0·67 and 1·17 μU per sec., being nearer to and probably a little less than the latter: it is judged to have a posterior-pituitary extract equivalence of 1 μU per sec., which is very close to the value reported just now for sucrose.

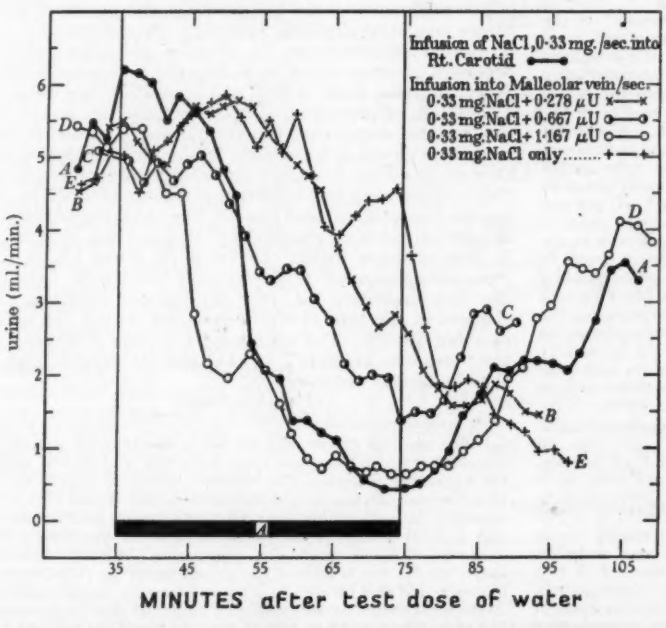

Fig. 11—"Nicky": effect of prolonged (40 min.) infusion of NaCl into carotid artery, and assay of response. With intracarotid infusion calculated local increase in osmotic pressure was 1·80%. Infusions were 1·254 M NaCl at 0·2725 ml. per min., and rectangle A covers their period. Graph A, intracarotid infusion; graph E, intravenous infusion. Graphs B, C, and D, responses to intravenous infusion with posterior-pituitary extract 0·28, 0·67, and 1·17 μU per sec. (Verney 1947).

The calculated increase in the osmotic pressure of the carotid blood during the intra-arterial infusion was 1·8%, corresponding to a local increase in blood chloride of 9 mg. per 100 ml.; and the experiment shows that under these conditions the "membrane" of the osmoreceptors maintains its relative or complete impermeability to sodium chloride, for at least 40 minutes.

Three conclusions follow from the results of the 40-minute infusions:

(1) Increases in the "osmotic pressure" of the arterial blood—increases which, when large, were shown by the short-period injections to release posterior-pituitary antidiuretic substance—still operate when reduced to values well within a range that may reasonably be regarded as physiological. In the dog on which most of the experiments reported here were made an increase of only 1·8% in the "osmotic pressure" of the carotid blood gradually reduced the rate of urine flow from a water-diuresis maximum to the sort of rate that prevailed at the beginning and end of a normal response to ingested water—i.e., a reduction of about 90%. The smallness of the "osmotic pressure" increase gains

NEPHRONS

Portion of nephron	1 nephron			2 kidneys: 10^6 nephrons
	Length (mm.)	No. of cells per mm. length of embedded tubule	Total no. of cells	Total no. of cells
Proximal convolution ..	13·7	740	8900	$8·9 \times 10^9$
Thin segment of Henle's loop	5·0	210	920	$0·9 \times 10^9$
Thick segment of Henle's loop	8·7	590	4500	$4·5 \times 10^9$
Distal convolution ..	5·0	600	2640	$2·6 \times 10^9$
Totals	32·4	—	16,960	$1·7 \times 10^{10}$

The lengths of the component parts of the dog's nephron are taken from Oliver et al. (1941). The length of a complete proximal convolution which I isolated in a partially macerated dog-kidney was 14·6 mm. The number of cells per mm. length of each portion of the nephron is the average in a series of counts of nucleoli which I have made in 10μ, 15μ, and 20μ sections of paraffin- or celloidin-embedded material. The figures for total number of cells are corrected for shrinkage of embedded tissue (Verney 1954).

additional interest when it is recollected that the carotid infusions were unilateral. On rare occasions one finds a dog in which it is impossible to produce an osmotic release from injections into one carotid, and this with injections that are so hypertonic that they approach those causing central nervous manifestations and an associated emotional release. Typically, however, an osmotic release is produced by injections or infusions into either carotid, though there are usually quantitative differences between the responses obtained from the two sides. These facts, coupled with the possibility that the hypertonicity of the common carotid blood may have been reduced by dilution with anastomotic blood from other arterial sources by the time the osmoreceptors are reached, suggests that an increase in the "osmotic pressure" of the aortic blood, which is a good deal less than that found effective in the carotid blood (i.e., 1·8%) would produce the same degree of inhibition of urine flow (i.e., a reduction to about 10% of the maximal rate of which the kidney is capable during water diuresis).

(2) The induced change in the "osmotic pressure" of the arterial blood which is responsible for this degree of reduction in urine flow releases posterior-pituitary antidiuretic substance at an average rate of 1 μU per sec., this being the intermediating agency through which the change in "osmotic pressure" becomes effective. This rate of release agrees well with the results of Shannon's (1942) experiments on replacement therapy in dogs with diabetes insipidus. In such dogs Shannon obtained graded antidiuresis with intravenous infusions of 1–5 mU per hr., and minimal urine flows were usually obtained with the upper limit of this range. My figure of 1 μU per sec. for the rate of endogenous release at such "resting" rates of urine flow as obtain at the subsidence of water diuresis in the healthy dog corresponds to $0·5 \times 10^{-9}$ g. per sec. in terms of the standard powder. This quantity, in view of the outstanding achievement of du Vigneaud and his colleagues (du Vigneaud et al. 1953, Taylor et al. 1953) in isolating and determining the chemical structure of vasopressin, can now be expressed as 2×10^{-12} g. of the pure substance—i.e., about 0·2 μg. daily.

Vasopressin has an octapeptide structure, and its molecular weight is about 1000, there being small species differences in its amino-acid constitution (du Vigneaud et al. 1953). Now, the number of cytons in the supraoptic and paraventricular nuclei of the dog is about 10^5 (O'Connor 1947). If, then, all the neurones are contributing to the release of 1 μU per sec. (12×10^6 molecules) at "resting" rates of urine flow, each neurone will be releasing on an average about 12,000 molecules per sec. Further, the intravenous injection of 1 mU (12×10^{11} molecules) in the dog reduces the urine flow during water diuresis to about 10% of its established value; and, since the total number of cells in the renal tubules is about 2×10^{10} (see table), this dose of pituitary antidiuretic substance will allow a maximal average of 60 molecules per cell, maximal in the sense that all the injected molecules are regarded as contributing to the big antidiuretic response. This number of molecules per cell is far below that needed to produce manifest effects in tissues or in populations of cells by the application of drugs. Thus the minimal quantity of sodium oleate needed to cause hæmolysis of red cells is 2×10^8 molecules per cell (Ponder 1930), and of phenol to cause death of yeast cells 3×10^9 molecules per cell (Clark 1933, from data of Herzog and Betzel 1911); and Clark (1933) finds that the minimal quantity of ouabain needed to produce arrest of the frog's ventricle is about 10^7 molecules per cell. The very low and maximally effective ratio of vasopressin molecules to kidney cells given above (60 : 1) supports, perhaps, the view that the action of the substance is restricted to a fraction only of the total length of tubule endothelium; but, even if we assume that all the injected molecules are taken up by and react with the cells of the distal convolution alone, the ratio becomes only about 500 : 1. The volume of a distal tubule cell in the dog is about $1·7 \times 10^3$ c.μ.

(3) With the recovery of urine flow when the intracarotid infusion is stopped (fig. 11) the secretion of posterior-pituitary antidiuretic substance is now being inhibited by the local fall in "osmotic pressure" and consequent depression of activity in the osmoreceptors, the progression of this recovery being attributable solely, I imagine, to the gradual disappearance of the quantity of antidiuretic substance that was maintaining the secretion of urine at a non-diuretic level; the absorption of water from the gut was complete long before and could not, as in the initial diuresis, be affecting the course of this secondary diuresis. The latent period between the peak of the water-load curve and the maximal rate of secretion of urine, to which I referred earlier (fig. 1), is clearly to be attributed to the same process.

Moreover, whereas the primary diuresis is preceded and accompanied by a small increase in renal plasma and filtrate flows, the degree of increase varying with the water load (Sellwood and Verney 1955), the secondary diuresis (fig. 11) appears while the water load is decreasing, and any drift in the plasma and filtrate flows will then be in the direction of a fall. Nevertheless water diuresis depends, of course, on an adequate primordial supply of glomerular fluid. Failure to realise this has, I think, been the cause of the many assaults to which the neurophypophyseal theory of water diuresis and of diabetes insipidus has been subjected during its chequered career, from experimental work in which factors of qualitative or quantitative abnormality have undesignedly obtruded as accompaniments of technical procedures.

The work done on the living animal and described here shows unequivocally that neurohypophyseal function is, in normal circumstances, an essential component of the processes involved in the renal response to ingested water. Water diuresis, then, is fitly and accurately described as a condition of physiological diabetes insipidus, and there can be little doubt that the antidiuretic secretion of the neurohypophysis is a hormone in the physiological sense that its liberation is mainly and continually governed by the contemporary concentration of sodium chloride in the carotid (see later) arterial plasma. The physiological fitness of this control is emphasised by its quantitative aspects, in that changes within the range of about 1% in the "osmotic pressure" of the arterial blood lead, through the intermediation of the antidiuretic hormone, to changes in the rate of water excretion within the range of about 1000%. The maintenance of near constancy in the "osmotic pressure" of the internal environment is thereby largely achieved.

To be concluded

"The medical officer and his whole department should be removed entirely from the local authority and placed under the executive council. The medical officer of health would then become adviser in preventive medicine to the executive council; be responsible to it for the nursing, health visiting and mental health departments of general practice. The executive council would be responsible to the education authority for the health of the school children. The medical officer would still be able to act as adviser on health problems to the local authority who might be bound by statute to consult the executive council in certain matters involving housing and the distribution of food. After-care would become the responsibility of the general practitioner. The ambulance services would pass to the control of the hospitals to and from which they carry patients."—*Research Newsletter*, College of General Practitioners, November, 1957, p. 279.

UNCOMMON MYOCARDIAL DISEASES

THE NON-CORONARY CARDIOMYOPATHIES*

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(*concluded from p. 1184*)

TYPES OF CARDIOMYOPATHY

Many kinds of disease may damage the myocardium, and in a case of isolated non-coronary myocardial disease it is usually difficult to recognise the exact cause. This difficulty often remains after full clinical investigation and even after examination of necropsy material. Difficulties arise because clinical findings may be similar in cases showing widely different myocardial histology, and because a different histological appearance may be found in conditions with similar ætiology. Possibly the histological appearance varies with the intensity of reaction and with the stage in the evolution of the disease at which examination becomes possible. In some cases it may be the result of a non-specific response to the necrosis of muscle cells from any cause. Clinical analysis, when correlated with various investigations and pathological findings, often indicates the broad ætiological group; but in many cases the ætiology remains obscure, and these must for the present be labelled "idiopathic."

Congenital

Evans (1949) described a distinct heart-disease which he called familial cardiomegaly. Somewhat similar cases with a family history had been reported before (Case records Massachusetts General Hospital 1942, Addarii et al. 1946), and others have been reported since (Davies 1952, Gaunt and Lecutier 1956, Campbell and Turner-Warwick 1956). Palpitation, slight giddiness, syncopal attacks, cardiac enlargement, triple rhythm, arrhythmia, and a family history of premature sudden death or of similar heart-disease are characteristic features. The electrocardiogram usually shows gross conduction defects. At necropsy the heart is large, weighing more than in other cardiomyopathies. Histological examination shows giant fibres with vacuolation, and usually much fibrous tissue (fig. 10). One patient (Blanshard 1953) who showed a cellular reaction as well as fibrosis, was subsequently shown to be one of two affected members of the same family (Campbell and Turner-Warwick 1956) (fig. 11). The pathological process presumably progresses from early life. Some patients die suddenly before symptoms develop, whereas others may be shown to have steadily increasing muscle damage by the evolution of symptoms and the progressive changes on the chest radiogram and in the electrocardiogram. Evans (1949) regarded this disease as hereditary and familial, like Friedreich's ataxia. Roth (1948) reported a family in which ataxia affected some members and dystrophy may heart-disease affected others. Muscle be associated with a fatal heart-disease (Storstein and Austarheim 1955), and a family with

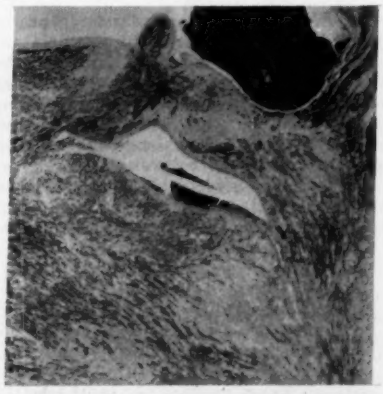

Fig. 10—Familial cardiomegaly: left ventricle with mural thrombus, massive fibrosis, and hypertrophied muscle.

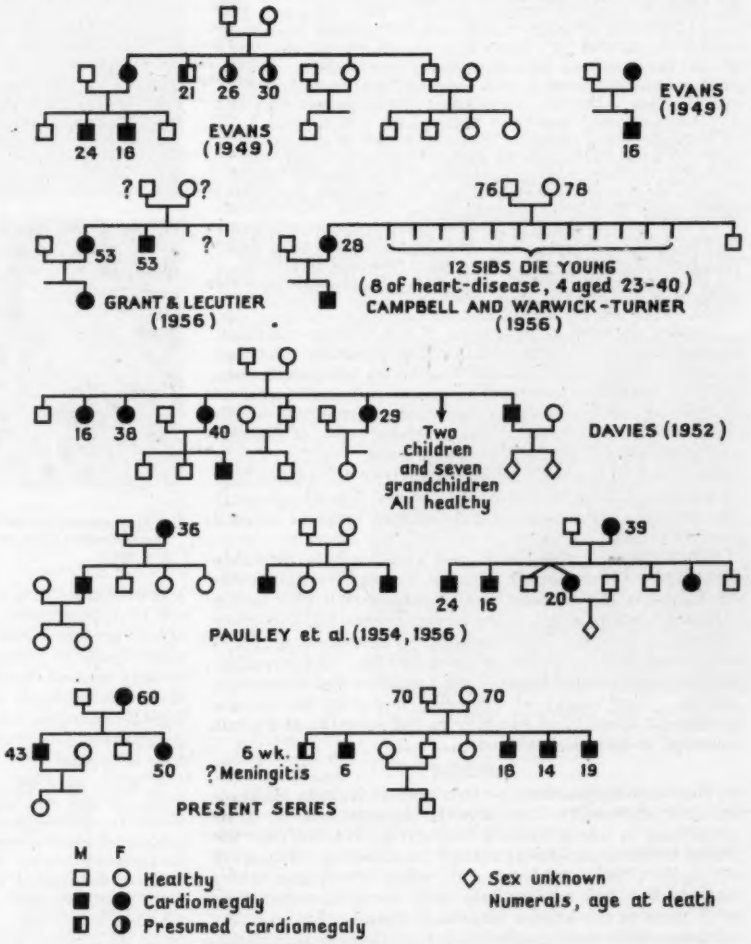

Fig. 11—Pedigrees of families (6 from literature, 2 from series) showing more than one member with cardiomyopathy. Usually the maternal parent has the disease where members from two generations are involved.

pseudohypertrophic muscular dystrophy in some members, cardiomegaly in others, and a combination of the two in 1 patient has been described (Kiloh and Nevin 1951); but there is no evidence which clearly identifies isolated familial cardiomegaly with the cardiomyopathy associated with these neurological conditions. The reported cases certainly confirm the existence of a familial heart-disease, and the evidence suggests a genetic origin. Campbell and Turner-Warwick (1956), reporting two more families with familial heart-disease, think that the evidence, though scanty, suggests that the disease is inherited as a mendelian dominant.

The present series contains 7 cases of familial cardiomegaly. When a second generation was affected, the maternal parent appeared to be responsible for its transmission, and this was also found in published cases (fig. 11). There are various possible explanations for this maternal transmission. Early death in affected males before procreation would produce the same result, but the data are inadequate for firm conclusions. Infection of the germ cell and later intrauterine infection—e.g., toxoplasmosis—as suggested by Paulley et al. (1954), are possible causes.

The wide age-range of siblings, the absence of a correlation with birth order, and negative tests in some cases are against this. On the other hand, infection with toxoplasma is widespread, and myocarditis is not uncommon in acute generalised cases of toxoplasmosis; the organism has been identified in heart muscle (Pinkerton and Weinman 1940). Paulley et al. (1956) found that several members of two families had an unexplained myocarditis. Toxoplasma was not seen in the myocardium on histological examination; but the complement-fixation test and the dye tests showed low-titre antibodies, which were held to indicate toxoplasmosis. The dye test is non-specific, and the whole evidence for this infection is slight, but it presents the interesting possibility that familial cardiomegaly and perhaps other forms of chronic cardiomyopathy may be due to toxoplasmosis.

In the present series none of 7 patients with idiopathic cardiomyopathy tested for toxoplasma antibodies gave positive serological tests; but they included only 1 man with a familial history of heart-disease, who died of heart-failure at the age of 40.

Further detailed investigation of this obscure condition is required, but it is clearly familial, probably inherited as a mendelian dominant, and limited by being extremely lethal. Probably there are as many different forms of congenital cardiomegaly as there are neurological conditions which are familial. The different types of familial cardiomyopathy described by Davies (1952), Evans (1949), and Blanshard (1953) and further differences seen in another family in the present series (fig. 11) support the view that there are several different types of familial heart-disease.

Fibroelastosis of infancy and childhood is probably congenital. It is certain that severe endocardial fibroelastosis has often been found in association with aortic stenosis, abnormalities of the coronary arteries, and other congenital lesions. Some authors (Thomas et al. 1954) considered this condition morphologically, and by inference ætiologically, identical with endocardial fibrosis in adults. The weight of evidence, however, is strongly against an identity of ætiology in the infantile and adult forms of endocardial sclerosis.

Infection

The term myocarditis is often used to include all kinds of cardiomyopathy, but here it is restricted to those conditions in which there is reasonable evidence that the lesion is due to, or closely related to, infection. The work of Saphir (1941) and Gore and Saphir (1947) and others has shown that myocarditis may occur in association with most of the known infectious diseases, but in many of these conditions myocarditis is not clinically significant. It is now clear that an isolated myocarditis may also be caused by viral, bacterial, rickettsial, and protozoal infection, but in such cases it is seldom possible to identify the infecting organism. This position is gradually changing, and in recent years isolated "idiopathic" myocarditis has been found to be due to a variety of organisms—e.g., influenza virus (Borden 1950, Finland et al. 1945), Coxsackie virus (Javett et al. 1956), *Trichinella spinalis* (Gould 1945), *Pasteurella tularensis*, toxoplasma, and *Trypanosoma cruzi* (Chagas' disease). The group of "idiopathic" cardiomyopathies is gradually becoming smaller as more infectious causes are recognised, but it is surprising that we do not encounter more intermediate cases of known infectious diseases in which myocarditis is dominant and the better-known manifestations of the disease appear in a minor degree.

Acute

An acute interstitial myocarditis has often been found at necropsy after sudden death (Glydell et al. 1955, Bowden 1950, Karni 1954). Sometimes death takes place in a few hours after the onset of symptoms, as in the case described by Gillis and Walters (1954), where chest pain, shock, and an abnormal electrocardiogram suggested cardiac infarction. Malaise and chills at the onset might have suggested infection in this case; an interstitial cellular reaction was found throughout the myocardium.

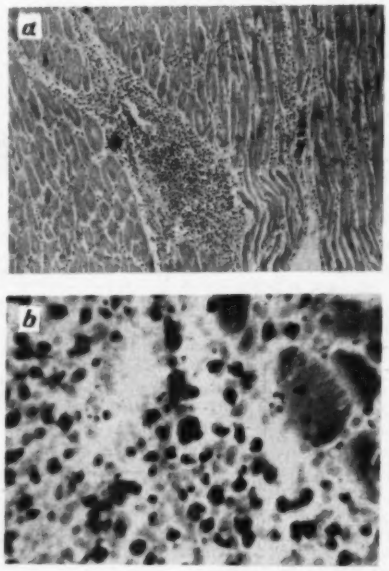

Fig. 12—Left-ventricular subacute myocarditis at homogeneous stage of development. (*a*, × 105; *b*, × 880.)

Subacute

Fiedler's name (1899) has been especially associated with myocarditis where the history is of a few weeks or months, but there is no evidence of a common ætiology in such cases. Any age and either sex may be affected. Pyrexia and a raised E.S.R. are not often present, but sometimes there is leucocytosis. Chest pain is common, but evidence of pericarditis is usually absent both clinically and at necropsy. The electrocardiogram shows the usual range of pathological changes, starting with T-wave inversion and progressing to ST and QRS abnormalities. The following case is typical:

A man, aged 42, presented with eight weeks' history of dyspnœa and five weeks' history of continuous retrosternal pain. On admission to hospital he had orthopnœa and gross congestive heart-failure. His blood-pressure was 90/75 mm. Hg. A leucocyte count showed 10,000 per c.mm. (monocytes 7·3%). Serological investigations were all negative. Mean right-auricular and pulmonary-capillary pressures were 18 and 20 mm. Hg. At necropsy the heart weighed 580 g.; there were mural thrombi, and histological examination showed interstitial myocarditis (fig. 12).

Idiopathic myocarditis with a giant-cell type of reaction (granulomatous myocarditis) without evidence of tuber-

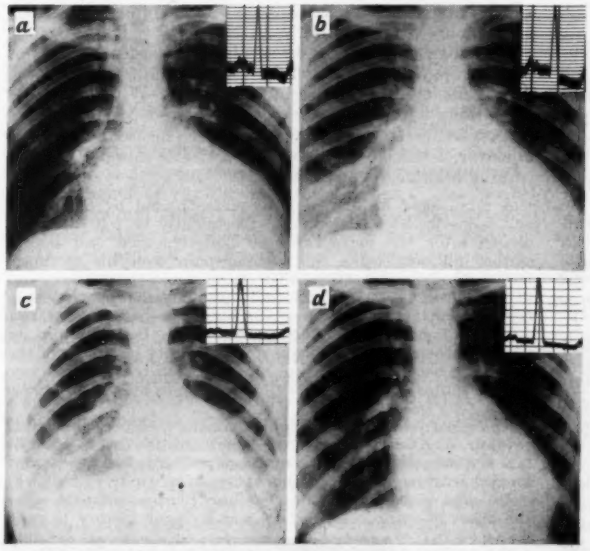

Fig. 13—Puerperal myocarditis showing decrease in size of heart with recovery from symptoms and signs of heart-failure; and electrocardiographic lead V6 showing ST depression and flat T wave, suggesting persistent chronic myocardial changes after initial improvement: *a*, in January, 1952, one month after delivery; *b*, in May, 1952; *c*, in January, 1953; *d*, in December, 1955.

culosis or syphilis is recognised but was not seen in this series. Such conditions are sometimes associated with a hypersensitivity state, and there are affinities with periarteritis nodosa and perhaps with sarcoidosis.

A special subacute myocarditis seems to occur in late pregnancy or in the puerperium. A group of such cases were described by Gouley et al. (1937). This condition is rare. In the present series 3 women developed heart-failure from myocardial disease at the end of pregnancy or early in the puerperium. None had hypertension, renal disease, or any symptoms suggesting either toxæmia or rheumatism. Bilateral heart-failure developed quickly and continued for several months with fluctuations in severity. Each patient recovered symptomatically and shows no sign of congestive heart-failure now, although cardiac enlargement and a pathological electrocardiogram still persist. Fig. 13 shows the course in 1 patient. A fourth woman, who developed symptoms of heart-failure four and a half years before her death and three years after pregnancy, may have had the same disease; on the other hand, she gave a family history of early sudden deaths of all of her mother's brothers; hence a congenital cardiomyopathy is more likely. Unfortunately the offspring of these women have not been examined. Another woman, who developed a curious myocarditis which mainly involved the atria, had had four miscarriages in the seven years before she died in a Stokes-Adams attack.

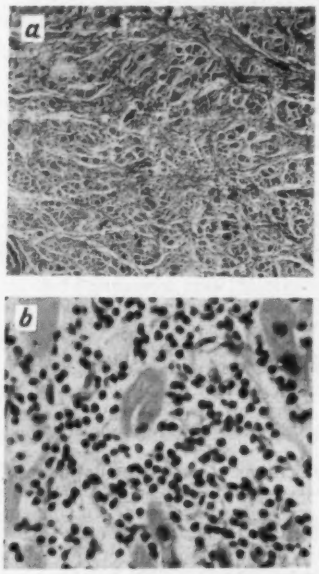

Fig. 14—Chronic myocarditis in girl, aged 13, with $2\frac{1}{2}$ years' history of symptoms after scarlet fever; *a*, area of myocardium showing irregular fibrosis (× 55); *b*, another area of left ventricular myocardium showing more active inflammation (× 500).

Chronic

A priori, we should expect that an acute myocarditis associated with known infections might heal and later produce symptoms from chronic myocardial damage. Perhaps most cases of idiopathic fibrosis and hypertrophy in adults are in this category, but diagnostic difficulty arises because heart involvement in the causal illness is often not recognised, and fibrosis develops late in other ætiological groups of cardiomyopathy.

In the present series there were 15 patients who had no history of familial heart-disease, hypersensitivity, alcoholism, or puerperal disorder, and no amyloidosis at necropsy. 9 of these gave a history of serious infections. Streptococcal fevers had occurred in 4, and cardiac symptoms began after a relatively short interval.

One girl, aged 13, had scarlet fever a few months before symptoms started, and another, aged 20, had scarlet fever seven years before. Death took place three years and two and a half years after the onset of symptoms, and histological examination in both cases showed a low-grade smouldering myocarditis with scattered foci of inflammatory cells, small areas of muscle necrosis, and slight fibrosis (figs. 14 and 15).

A 3rd patient had scarlet fever in adolescence many years before death at 58; this was probably not the cause, but during early adult life there were attacks of paroxysmal tachycardia. Necropsy showed diffuse myocardial fibrosis.

The 4th patient had an illness in which severe tonsillitis was followed by dull chest pain: further chest pain on exertion, with much dyspnœa, caused admission to hospital, where he remained for several months under treatment for heart-failure. He recovered slowly and led a healthy life until the insidious onset of heart-failure, without pain, led to death twenty years after the first illness. At necropsy there was widespread myocardial and endocardial fibrosis at an even stage of development.

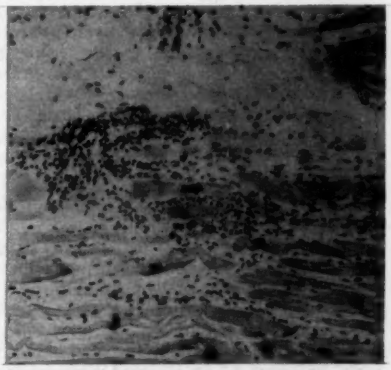

Fig. 15—Chronic myocarditis after scarlet fever showing a small patch with active inflammation—sections elsewhere showed patches of fibrous tissue.

In addition to these 4 patients with antecedent history of streptococcal infection, 5 others died with hearts showing patchy chronic myocarditis and had histories of recurrent severe infections of the respiratory tract (including 2 with bronchiectasis). Such evidence for a chronic infectious ætiology is clearly inconclusive, but in this group of 9 patients the history of severe infections in the past is probably significant.

Collagen Disease

Isolated myocardial disease is sometimes attributed to collagen disorder. The ætiology of collagen disease is almost entirely unknown, but evidence favours the continuation of a hypersensitivity state possibly associated with infection. Several more or less distinct clinical conditions are justifiably grouped as collagen disease because they have certain pathological changes in common. These changes affect the intercellular ground substance and the formation of connective tissue. Various degrees of cell necrosis, interstitial cell reaction, and repair processes are associated. In some conditions the small vessels are especially affected, and organ damage is largely the result of ischæmia, whereas in other conditions a more diffuse tissue damage is found in association with fibrinoid necrosis and vasculitis.

The various diseases in this group are distinct, and their diagnosis is relatively clear, but intermediate varieties occur. It is well recognised that in all of them the heart is often involved. It is therefore possible that this type of reaction may be responsible for isolated myocardial disease.

Hypersensitivity.—The most acute collagen disorders appear to be due to hypersensitivity, and in the severe forms an acute necrotising vasculitis is associated with proteinous intercellular exudation. Serum-sickness is an example; it has led to pericarditis, myocarditis, and even cardiac infarction (Roussak 1954).

Sikl (1936) described 2 cases of allergic myocarditis associated with neoarsphenamine; eosinophil exudation and giant cells were present in the myocardium. Löffler (1936) described 2 cases of fibroplastic endocarditis with extreme eosinophilia, and Lennox (1948) found a similar pathology in a patient with status asthmaticus. Similar granulomatous changes have been recorded in occasional cases of entirely isolated myocarditis.

Periarteritis nodosa.—In periarteritis nodosa a diffuse myocarditis may occur but more commonly local coronary arteritis causes areas of ischæmic fibrosis. Watt and Lynch (1956) have reported an interesting case in which an unsuspected endomyocardial fibrosis was associated with periarteritis nodosa in a 12-year-old boy. Abdominal pain had occurred and was due to mesenteric arteritis. A similar endomyocardial fibrosis was found in a boy in the present series. After his death from heart-failure, no arteritis was found; but besides chronic endocardial fibrosis, there were foci of cells in the myocardium, suggesting that the disease was a continuing process. His electrocardiogram (fig. 6) shows that such a lesion may cause extensive Q waves.

Lupus erythematosus.—In disseminated lupus erythematosus the myocardium is less commonly involved than the endocardium or the pericardium, which is almost always affected. Fibrinoid necrosis associated with the formation of hæmatoxylinophil bodies may be found in the myocardium. Foci of cellular reaction and occasional patches of vasculitis with a healing lattice fibrosis also occur. The lupus type of heart lesion does not seem to occur as an isolated phenomenon, and nothing like it was found in the present series.

Scleroderma.—Diffuse systemic sclerosis (scleroderma) is sometimes associated with widespread myocardial sclerosis; cellular reaction and arteritis are minimal. Isolated myocardial sclerosis of this nature was not present in any of the cases investigated.

Search for Evidence

In searching for the causes of an isolated cardiomyopathy, the collagen diseases must be kept in mind. A history of previous infection followed by symptoms of hypersensitivity are suggestive: and, on physical examination, rashes, nodules, joint lesions, conjunctivitis, stomatitis, and evidence of serositis and arteritis should be sought; and a high E.S.R., eosinophilia, and abnormal serum-proteins are further clues.

Histological examination of the myocardium in 27 of the necropsy cases did not show eosinophilic myocarditis, giant cells, arteritis, or fibrinoid necrosis. With 3 possible exceptions none of the cases investigated presented any certain evidence of collagen disease. The following case, however, is possibly an example of idiosyncratic or continuing allergic myocarditis.

A man, aged 33, had dental sepsis treated by extraction and large doses of penicillin. Subsequently he felt ill, and a month after the extractions he had dyspnœa and tachycardia, followed by a dull aching pain over his sternum. He developed congestive heart-failure and responded well to treatment at first, but later he became progressively resistant to therapy. During the illness he had at least two attacks of paroxysmal tachycardia. He had episodes of severe pruritus, and his tongue and eyes were sore most of the time. He became sensitive to mercury, and transient curious painful lumps appeared from time to time in his subcutaneous fat.

The gross œdema, high jugular venous pressure, and triple rhythm suggested constrictive pericarditis as a possible but improbable cause. Diagnostic pericardotomy was performed with negative results.

He died in congestive heart-failure fourteen months after the onset of symptoms. There was a vague history of mild bronchial asthma in childhood, and two years before death he had had a curious illness with splenomegaly, pains in the limbs, and pyrexia, for which no cause was found. At necropsy his heart weighed 690 g., and histological examination showed hypertrophic muscle-fibres and occasional areas of necrosis associated with a massive proteinous interstitial exudate. The coronary arteries were normal (fig. 16).

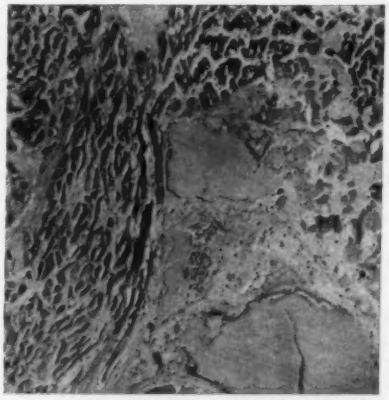

Fig. 16—Hypersensitivity myocarditis: left-ventricular myocardium showing interstitial proteinous eosinophil exudate.

An eosinophilia of 40% in white-cell counts of 7000–8000 per c.mm. persisted throughout the illness of one of the patients. The typical features of heart-failure from isolated cardiomyopathy were present; but no evidence of hypersensitivity or of collagen disease was obtained, and at necropsy the endocardial changes were very slight.

Another patient, who is still alive, developed gangrene of a leg while under treatment for heart-failure due to cardiomyopathy. The operation specimen showed arteritis like thromboangiitis obliterans. There was no evidence of systemic embolism.

The hæmolytic streptococcus is an accepted source of antigen, but the 4 cases of myocarditis with a past history of scarlet fever yielded no evidence of a collagen disease or of hypersensitivity reaction, though 1 case showed complete fibrotic occlusion of one or two small arterioles among the masses of myocardial fibrosis.

Arteritis limited to the coronary vessels may occur in experimental allergic lesions in animals; but in man cardiomyopathy is rarely, if ever, an isolated manifestation of the recognised collagen diseases. Cases of isolated hypersensitivity myocarditis occur, but these are rare among the whole group of cardiomyopathies.

Amyloidosis

Systemic amyloidosis is considered separately from collagen disease and appears to be a disorder of protein metabolism. The published reports of this condition make it clear that cardiac amyloid is often the major, if not the only, manifestation of primary amyloidosis. The heart is rarely involved in the secondary form.

Amyloid is a glycoprotein of slightly varying composition and hence of variable staining reactions. It appears in the reticulum around the muscle cells, and these then disappear without a cellular reaction. It may be present in the myocardium of any or all of the chambers of the heart. The pericardium is sometimes involved, but the greatest amount is in the muscle, where it tends to affect the subendocardial region. The atria are nearly always affected, and atrial arrhythmia is particularly common.

Cardiac failure develops quietly and is of the pattern described. Paradoxical venous pulsation is common; and, since the heart does not become very large, constrictive pericardial disease may be difficult to differentiate unless there is evidence of amyloidosis in other organs. Other symptoms, due to amyloidosis elsewhere, may be slight or apparently unimportant; but hoarseness, slight dysphagia, macroglossia, and purpura are important clues and may indicate the diagnosis. Amyloidosis is most common after middle life.

Cardiac amyloidosis is not very rare. Benson and Smith (1956) have reported 5 cases which were investigated at The London Hospital in 1947–51, and 6 further cases from the same hospital are included in the 7 cases in the present series. Pericardotomy was done on 1 patient, a possible case of constrictive pericarditis, and another was sent to The London Hospital for this operation. Even when there are no clues pointing to amyloidosis in other organs, the electrocardiograms will always distinguish amyloidosis from constrictive pericarditis. To produce the severe heart-failure with little cardiomegaly, which causes confusion with constrictive pericarditis, the myocardium must be so damaged that the electrocardiogram apparently always shows a low-voltage graph with Q waves or near-Q waves (fig. 17).

Although the 7 cases included in the present series were thought to be mainly isolated cardiomyopathy, cutaneous purpura occurred in 2, the vocal cords were involved in 1, and peripheral neuritis occurred in 1 other. 4 patients died of congestive heart-failure, 1 of uræmia, 1 of pulmonary embolism, and 1 of an apparently unrelated cardiac infarction.

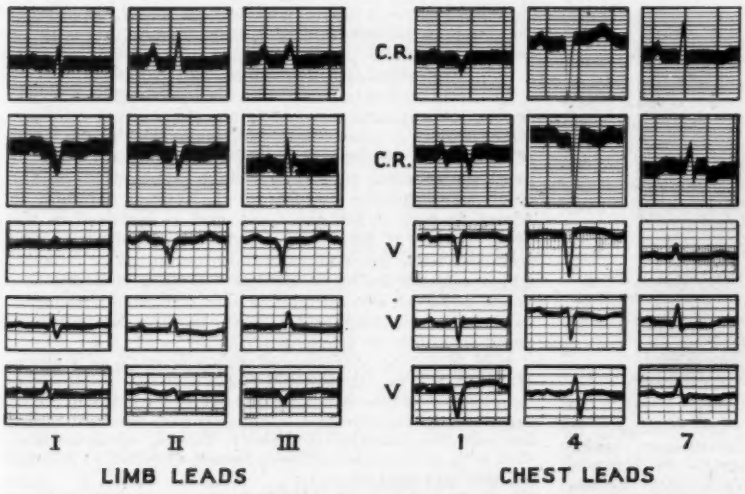

Fig. 17—Primary cardiac amyloidosis (5 cases proved at necropsy). All show low-voltage and pathological Q waves or near-Q waves in limb leads or in anterior chest leads.

Nutritional Heart-disease

The Oriental form of beriberi, which is due to a diet of polished rice, is almost never seen in Great Britain. Wenckebach spoke of its cardiovascular effects in the second of the St. Cyres lectures (Wenckebach 1928) and a further description of beriberi heart-disease and the rapid circulation associated with it was given by Aalsmeer and Wenckebach (1929). Keefer (1930) found evidence of this hyperkinetic state in only a third of the cases seen in China, and Weiss and Wilkins (1936) pointed out that Occidental beriberi differed from the Oriental form and often presented with signs of left-ventricular disease. Chronic hypokinetic heart-failure is probably the most common mode of presentation of nutritional cardiomyopathy and always a late development. The myocardium shows hydropic degeneration and a patchy necrosis with variable fibrosis. Similar lesions have been described in thiamine-deficient animals (Ashburn and Lowry 1944, Rinehart et al. 1947), and the lesions closely resemble those found in potassium deficiency (Follis et al. 1942).

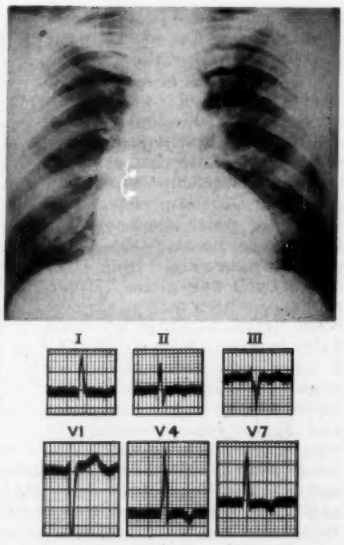

Fig. 18—Alcoholic cardiomyopathy. Moderate cardiac enlargement and small inverted T waves in leads II, V4, and V7.

Alcoholism is the important cause of nutritional heart-disease in the Occident; females are rarely affected. Steell (1906) wrote about alcoholic disease and even noted its similarity to "a disease known as beriberi." Mackenzie (1902) referred to alcoholic heart-disease, and several workers have written about it from time to time in the past twenty-five years, but the existence of a distinct non beriberi alcoholic cardiomyopathy is still not widely accepted.

The wide range of alcoholic heart-disease is shown in the 22 cases described by Benchimol and Schlesinger (1953). The clinical picture varies from hyperkinetic heart-failure, responding well to thiamine (Price 1938, Jones and Bramwell 1939) to hypokinetic heart-failure not responding to vitamin therapy (in these the muscle shows mainly hypertrophy and fibrosis). In all 12 patients with alcoholic heart-disease reported by Blankenhorn et al. (1946) the response to thiamine was poor. It is perhaps significant that alcohol is often mentioned in the case-reports of so-called idiopathic hypertrophy. Levy and von Glahn (1944) described 10 adult cases, in 4 of which alcohol was a

possible factor; and 1 of 3 patients reported by Serbin and Chojnacki* (1955) was an alcoholic.

The association of a very high intake of alcohol over a long period and the development of a certain clinical pattern of heart-disease is so close that an ætiological relationship is highly probable. In the present series 13 cases were diagnosed as alcoholic cardiomyopathy. The patients' ages ranged from 41 to 69: all but 1 were males. 7 drank nothing but beer, with an average consumption of about ten pints a day for ten to forty years. The 6 other patients drank one or more bottles of spirits a day for ten to twenty years. Symptoms and signs appeared earlier and were more severe in those who drank spirits. All presented with dyspnœa on exertion, and in several this was accompanied by palpitation. None had chest pains at any time, and none had syncope. Bronchitis was common, but none had serious chest disease. There was a family history of alcoholism in 4 cases but no familial history of heart-disease. 1 patient had had gout; 2 had had delirium tremens; and some others had had stomatitis, dermatitis, pain in the legs, and attacks of nocturnal sweating. 4 were engaged in the liquor trade; 3 belonged to the leisured wealthy; and the poorer ones not in the liquor trade were either bachelors or separated from their wives. Nutrition was uniformly good at the onset of symptoms; several were plethoric, robust, and hearty, and 2 were frankly obese. Evasiveness, irascibility, indifferent cooperation, and lying were common. The true alcoholic habits were often revealed only after pressing or persistent interrogation, or through similar interrogation of relations.

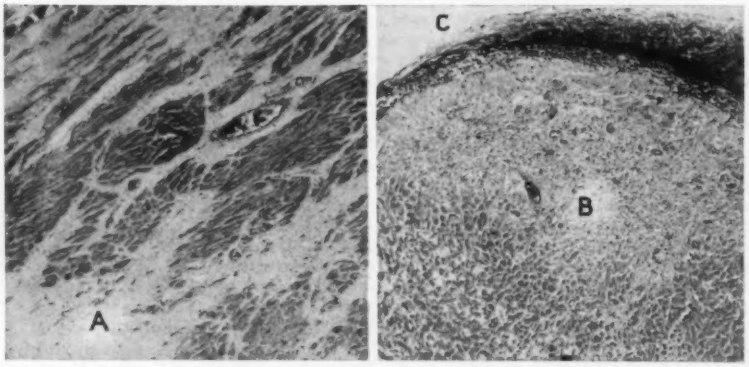

Fig. 20—Alcoholic cardiomyopathy. Left-ventricular myocardium showing (A), patches of fibrous tissue, and (B), recent small area of necrosis in base of papillary muscle with overlying mural thrombus (C). (No coronary disease at necropsy.)

Congestive heart-failure is soon manifest after the onset of symptoms and is of the same form found in other cardiomyopathies, but with a greater emphasis on left-ventricular failure. Tachycardia is usual, and irregularity from extrasystoles or from atrial fibrillation is common; the pulse tends to be small, and examination showed no evidence of hypertension. Half the patients presented good clinical evidence of a low-output state; none had a hyperkinetic circulation; none had "hepatic" palms, increased pulse pressure, or any evidence suggesting the presence of circulating vasodilator substances. On auscultation there was the usual triple rhythm from muscle failure, and only 1 patient had a systolic murmur. The nervous system was mostly normal, but 3 patients had no ankle-jerks, and 1 had a retrobulbar neuritis said to be due to alcoholism. 3 had mild dermatitis. None was anæmic, and most had rather high hæmoglobin levels.

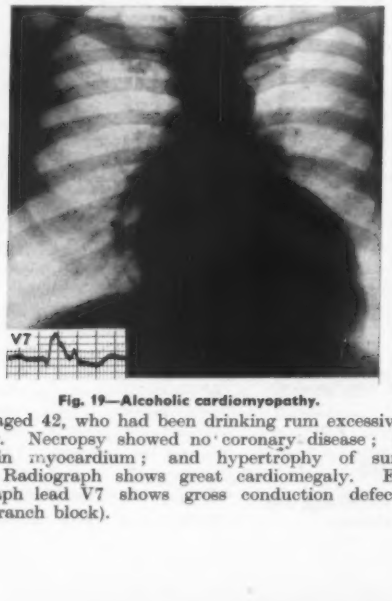

Fig. 19—Alcoholic cardiomyopathy.

Man, aged 42, who had been drinking rum excessively for 20 years. Necropsy showed no coronary disease; patchy lesions in myocardium; and hypertrophy of surviving fibres. Radiograph shows great cardiomegaly. Electrocardiograph lead V7 shows gross conduction defect (left bundle-branch block).

Electrocardiograms confirmed that arrhythmia was due to atrial fibrillation in 5 patients. In sinus rhythm the P waves tended to show slight right-atrial preponderance. The QRS-T complexes showed various degrees of ventricular damage. The T wave was often small and inverted in the left chest leads (figs. 7 and 18); pathological Q waves did not occur in any, but left bundle-branch block (fig. 19) developed in 4 heavy drinkers of spirits. Radiography showed from slight to gross cardiomegaly (figs. 7, 18, and 19).

Usually the response to routine treatment for heart-failure was moderately good at first, and there was little, if any, difference in that of patients who received large doses of thiamine and those who had none. The electrocardiogram showed only slight improvement, and repeated attacks of congestive heart-failure showed a progressively diminishing response to therapy. 5 of the 13 patients died: 2 came to necropsy, and there was no evidence of coronary disease, but there were patchy areas of muscle damage and a tendency to mural thrombosis (fig. 20). The duration of symptoms was from two and a half to five years.

Endomyocardial (Endocardial) Fibrosis

The term endomyocardial fibrosis describes the morbid-anatomical appearance in conditions of uncertain ætiology. Minor degrees of it are common in any of the chronic forms of myocardial disease and should not be confused with the great endocardial thickening which appears to be the result of a specific disease which, though common in Africa, is rare in Britain. (No case is included in the present series.) Nor should endomyocardial fibrosis be confused with the endocardial fibroelastosis of infants, which appears to be congenital. During the past few years, however, several reports have indicated that endocardial fibrosis leading to death from heart-failure is common in certain parts of Africa.

Bedford and Konstam (1946) described 40 cases from the Middle East. Davies and Ball (1955) and Ball et al. (1954) described a similar condition in Uganda. O'Brien (1954) described 25 cases from the Sudan; and Nwokolo (1956) has seen the condition in Eastern Nigeria, where he finds that 40% of the cases of heart-disease admitted to hospital are cardiomyopathies.

These African cases probably have a common ætiology. The evidence favours an infection.

Treatment and Prognosis of Heart-failure in Cardiomyopathy

Digitalis and mercurial diuretics mostly produce a good initial response. Symptoms improve, the venous pressure falls, the arterial pulse pressure increases a little, and œdema diminishes. There is usually little or no change in the size of the heart, triple rhythm tends to persist, and the electrocardiogram remains abnormal. Patients with a relatively acute onset and stormy course do not respond well to routine therapy.

Episodes of failure may be associated with nutritional damage to the already injured muscle; partial recovery is followed by an episodic downhill course in most cases. After a variable but often short interval, congestive failure reappears and becomes progressively less responsive. Death may take place suddenly and often rather unexpectedly during a recovery phase; but in many cases it follows weeks of progressive deterioration with low cardiac output. No specific therapy is known for the varieties of cardiomyopathy which have been discussed.

Although it may be assumed that most cases of myocarditis associated with known infectious diseases recover spontaneously, it is rare for the patient with isolated cardiomyopathy to show signs of a regression of the fundamental pathological process. Occasional cases show slow recovery and no further tendency to heart-failure, but the great majority of patients with symptoms from isolated muscle disease, whatever its nature, die between one and three and a half years of the first symptoms suggesting heart-failure.

Conclusion

The isolated myocardial diseases are usually distinguishable from the more common forms of cardiomegaly with heart-failure. Important points are: the insidious development of symptoms from biventricular failure; the high venous pressure and the characteristic wave of the venous pulse; triple rhythm in the absence of murmurs; the diffuse nature of the electrocardiographic changes; and, on radiography, the clear silhouette of a relatively immobile heart.

Cardiomyopathies may be caused by any of the known disease processes which affect other systems in man. Every case of suspected cardiomyopathy demands a detailed history, repeated examination, and elaborate investigation. By such means the proportion of cases termed "idiopathic" should be diminished, and the whole picture of these interesting conditions made clearer.

I am indebted to the physicians to The London Hospital and The National Heart Hospital, and to Dr. Aubrey Leatham, for help with case-material; it is a pleasure to thank Dr. Reginald Hudson for much help with the pathology, Dr. William Evans for his advice and Sir John Parkinson for help with terminology.

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LIGATION OF ANKLE COMMUNICATING VEINS IN THE TREATMENT OF THE VENOUS-ULCER SYNDROME OF THE LEG

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FOR more than four years we have cared for many patients with venous-ulcer syndrome of the leg; 174 of these have been treated by ligation of incompetent perforating veins of the ankle. Three of us worked at different hospitals, and one at all three. Our experience has convinced us of the usefulness of this operation; and this is a report of our results up to June 30, 1957.

Operation

The operation was begun when it was described by Cockett and Elgan Jones (1953), and for eighteen months an extrafascial ligation of two or three communicating veins passing through the deep fascia behind the lower third of the tibia was done. Through the penetration of an extra-sharp scalpel the ease of doing the operation subfascially was discovered. The veins were more obvious, and it led to a more thorough operation, because occasionally a vein was in two divisions which joined on the surface of soleus muscle immediately before entering the posterior tibial venæ comites, a state that could easily be missed with the extrafascial ligation; also, additional

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incompetent veins were occasionally found. Furthermore, after eighteen months some patients who had been operated on extrafascially returned with recurrent symptoms and ulceration. Consequently, in August, 1954, we adopted what we now call the radical subfascial ligation of the communicating veins of the lower leg.

Diagnosis and Cause

We are often asked, "How do you diagnose incompetence of the ankle communicating veins?" We diagnose them by the history, examination of the limb, tourniquet tests, and occasionally by venography. There is often a history of deep thrombosis in one or both legs, associated with an accident, fracture, illness, operation, or pregnancy in the preceding thirty years:

History of deep thrombosis	74 cases
No history of thrombosis	49 „
No mention in notes	51 „
Total	174 „

Deep thrombosis in 74 out of 123 cases is 60%. Since phlebothrombosis is clinically silent, the proportion may well be higher. Therefore we believe that thrombosis is the cause of communicating-vein incompetence in most cases, although in 49 cases—i.e., 40%—we reluctantly assume the existence of idiopathic venous incompetence.

Physiopathology

The physiopathology is described by Dodd and Cockett (1956) as follows:

"The root cause of the induration and ulceration syndrome of the lower leg is the destruction of the valves in the ankle perforating veins. This valve destruction is brought about by thrombosis which usually starts in the venous sinuses in the lower part of the soleus, spreading into the posterior tibial vein, and so into the ankle perforating veins. This allows the high venous pressure which normally occurs within the calf on exercise to be transmitted straight out to the subcutaneous tissues drained by these perforating veins. The effect of this is to cause venular dilatation over the whole of this area. The reaction of the tissues to this localised, high venous pressure varies considerably, but the usual result is subcutaneous fat necrosis and subsequent organisation with the formation of a hard plaque, which may or may not ulcerate. Ulceration is usually precipitated by trauma or infection.

"The role of incompetence of the great or small saphenous systems in the production of ulcers and induration of the ankle is probably less important than generally assumed, although they add their quota to the 'venous burden' of the ulcer area."

Varicose Veins

Of our 174 patients 110 (62%) had had a previous operation for varicose veins, but the ulcer syndrome had returned and caused us to tie the ankle perforating veins. The signs we look for are not varicose veins; these may be inconspicuous, although they were present in about a third of our patients.

In our practice ligation of the ankle communicating veins has been done for cases of ulcer at the classical sites, often recurrent, or pre-ulcerous states, usually with a history of deep venous thrombosis. Any of the stages of the ulcer syndrome may be the dominant feature, but in our patients the ulcer, past or present, was the commonest presentation.

Additional points are scarring from previous ulcers, pigmented skin and eczema, and areas of induration due to fat-necrosis, a cyanosed foot with telangiectasis around the malleoli, and swelling of the lower leg, ankle, and dorsum of the foot. There is discomfort on standing or walking. Direct signs of incompetence of ankle perforating veins are lower-leg venous blow-outs and tenderness over the points where the ankle perforating veins penetrate the deep fascia. The chief symptoms and signs were as follows:

Ulcer	117 cases
Eczema	61 „
Pain	43 „
Swelling	39 „

Arterial, syphilitic, tropical ulceration, &c., are excluded, but the arterial supply to the limb is always examined.

Age-distribution

The age-groups of the 174 patients treated were as follows:

Age (yr.)	*No. of cases*
21–30	2 (1·7%)
31–40	19 (10·9%)
41–50	56 (32·3%)
51–60	54 (31·2%)
61–70	27 (15·0%)
71–80	16 (9·1%)

Thus the largest age-group with the ulcer syndrome is the fifth and sixth decades. Even in older patients the operation was worth while (table II). We have offered ligation of the ankle communicating veins to every patient who had incompetent ankle veins, who was a reasonable surgical risk.

Sex-distribution

There were 129 females and 45 males, the preponderance of women being about 3 to 1.

Limb Affected

The operation was done on the right side in 54 cases, on the left in 83, and bilateral in 37, making a total of 211 limbs operated on. The slightly higher incidence of the ulcer syndrome on the left side is about 4 : 3, which is in accord with general teaching.

Surgical Anatomy

The anatomy of the ankle communicating veins has been detailed by Cockett and Jones (1953), who showed that these veins are in two groups, the inner and the outer. There are three medial, which are about 2 in., 4 in., and 6 in. above the internal melleolus at the posterior border of the tibia, and usually two lateral, 2–7 in. above the external malleolus on the outer side of the tendo Achillis.

Besides these vessels our experience has taught us to look for others. There are one or two calf communicating veins which pass into the medial junction of tendo Achillis and the gastrocnemius muscle, and occasionally a large perforating vein passes from the short saphenous vein into the belly of the gastrocnemius muscle.

Technique

Our operation approaches that described by Linton (1953). Under general anæsthesia the patient is tilted 10° head-down, for the bleeding can be copious. We rarely operate in the presence of an ulcer or of eczema. These are healed first by ambulatory pressure-bandaging; we have not had to graft skin. The incision runs $^3/_4$ in. behind and parallel to the posterior border of the tibia for 10 in., finishing behind the internal malleolus. It is deepened through the deep fascia, which may be thick and dense. There are three phases of the operation: division of the medial, calf, lateral, and other perforating veins; closure of the skin; and application of the pressure bandage.

Medial Tibial Veins

These perforate the deep fascia precisely at the posterior border of the tibia and lie on the soleus muscle for about $^1/_8$–$^3/_4$ in. before entering the tibial venæ comites, which are hidden by the muscle. The soleus muscle and extensor hallucis tendon are wiped backwards off the deep fascia of the anterior flap until the sharp posterior border of the tibia is palpable from end to end.

The communicating veins are then visible, passing from the hole in the deep fascia to the soleus muscle. They vary in size. Usually one or two are obviously pathological in that they are large, white, thickened, and surrounded by fat. Healthy veins are small, blue, thin-walled, and glistening. Those pathological, and those doubtfully so, are divided.

Test for Incompetent Vein

When a healthy perforating vein is cut it bleeds from its distal end because its blood flows this way, and the

valve in the proximal part prevents outward bleeding. When such a vein is incompetent because it is valveless, on division there is vigorous bleeding from the deep part. This was described by Warwick (1931) and is known as his " bleed-back " sign. It has been present in most of our patients. Further, many of these veins have proved on histological section to be diseased from previous thrombosis. Cockett and Jones (1953) say that the middle and upper communicating veins are mainly diseased but we have found that the lower ankle vein has been enlarged, thickened, and fatty often enough to convince us that it can be diseased and merits our search. We have had to reoperate on 2 patients in whom symptoms persisted, after we had failed to divide it at the first operation. It may perforate at the internal malleolus or $^1/_2$ in. behind it. Care has to be taken not to mistake it for the posterior tibial vessels, which are superficial here and present readily.

Calf Communicating Vein

This is on the medial aspect of the junction of the gastrocnemius muscle and the tendo Achillis. It may be double. It is longer than the medial veins and is not so often diseased. The skin and fat may be indurated over it, or may have been ulcerated. In any case the vein is divided to give access to the lateral perforating veins. About 1 in. above it a notable communicating vein may pass from the deep fascia into the belly of the gastrocnemius muscle; this is ligated when it is large.

Lateral Communicating Veins

To expose these the posterior edge of the wound is strongly depressed and the calf muscles are raised with a retractor, thus exposing the lateral aspect of the soleus muscle beyond the tendo Achillis. This region is explored 2–9 in. above the external malleolus, and usually two lateral communicating veins are found about 2–6 in. above the lateral malleolus. These are divided when enlarged.

While this is being done, the external saphenous vein is visible through the deep fascia, and on several occasions it has been obviously varicose when we had not diagnosed it so clinically. Later it has been ligated and stripped. We now look preoperatively more carefully than hitherto for varicosity of the short saphenous vein.

Other Veins

Our operations have taught us to explore widely beneath the fascia for other perforating veins. Rarely a large vein has been found passing into the soleus muscle immediately behind the fibula. Another may penetrate behind the upper part of the tibial shaft; this constitutes a fourth medial perforating vein. One or more vessels may be found entering the gastrocnemius muscle; limbs vary widely in their development of defective communicating veins.

Skin

We have not sutured the deep fascia since October, 1954; we have found it unnecessary. The skin is closed with a subcuticular catgut stitch which does not require removal.

Aftercare

The leg is pressure-bandaged with 'Lestreflex' diachylon strapping. Patients get up next day and are discharged in two or three days to their duties.

Healing

Healing of the wound has usually been uneventful. A few patients, especially after the extrafascial ligations, had marginal necrosis; these recovered with continued pressure-bandaging, as if the limb were ulcerated. Only occasionally has an antibiotic been given postoperatively, perhaps when there was mild dermatitis. We have depended on hæmostasis, asepsis, and atraumatic work for our consistent results. The first dressing remains unchanged for three or four weeks. Occasionally the skin about the wound becomes moist; this responds to pressure-bandages changed fortnightly. The scar is protected by diachylon bandaging for at least three months and, if scarred, for years by elastic stockings.

TABLE I—RESULTS ACCORDING TO TIME SINCE OPERATION

Time since operation	Total	Good	Fair	Unsatisfactory	Untraced
Under 6 mos.	16	10	5	1	0
6 mos.–1 yr.	16	14	1	1	0
1–2 yr. ..	46	33	7	4	2
2–3 yr. ..	59	50	5	4	0
3–4 yr. ..	29	25	3	1	0
4–5 yr. ..	8	3	0	1	4
Total ..	174	135 (77·5%)	21 (12%)	12 (6·9%)	6 (3·4%)

Results

No patient has died or had deep thrombosis, embolism, or acute sepsis.

We have classified our results into three groups: good, fair, and unsatisfactory. By " good " we mean that the ulcer has remained healed; swelling, eczema, and induration have disappeared; and the scar has become supple and mobile. We say " fair " when the ulcer or the dominant sign has subsided, but the skin condition is not perfect, as shown by coarseness or œdema. In a few cases, the ulcer has recurred owing to injury, but it has healed with pressure-bandaging. We label as " unsatisfactory " those in which the dominant symptom has persisted or there has been a spontaneous recurrence of the ulcer.

We emphasise, however, that our unsatisfactory patients are ambulant and more comfortable. All are occupied according to their age, and their only inconvenience is the need for a pressure-bandage to be changed every 2–8 weeks. Our search for other incompetent perforating veins continues. We are sensitive to the handicap of arteriosclerosis, diabetes, and rheumatoid arthritis. Table I shows the results according to time.

TABLE II—RESULTS ACCORDING TO AGE

Age (yr.)	Total	Good	Fair	Unsatisfactory	Untraced
21–30 ..	2	1	0	0	1
31–40 ..	19	16	2	1	0
41–50 ..	56	42	9	4	1
51–60 ..	54	40	7	7	0
61–70 ..	27	23	1	0	3
71–80 ..	16	13	2	0	1
Total ..	174	135	21	12	6

Of 174 results 135 (77%) are good, 21 (12%) fair, and 12 (7%) unsatisfactory. Of 96 patients seen two or more years after their operation 86 show a good or fair result, and only 6 an unsatisfactory one.

Table II shows the results according to age-groups.

It will be noticed that, in the older age-groups—i.e., 61–80—of 43 results there are 36 good and 3 fair. The worst decade seems to be the sixth (51–60), with 7 unsatisfactory, 7 fair, and 40 good results out of 54.

Reoperations

We have reoperated on 20 patients because the original division of the communicating veins was judged to have

TABLE III—REOPERATIONS

Cause of reoperation	No. of cases
Ulcer	17 (85%)
Eczema	1 (5%)
Pain	1 (5%)
Swelling and pain	1 (5%)
Total	20

Results of reoperation			
Good	Fair	Unsatisfactory	Untraced
11 (55%)	6 (30%)	3 (15%)	0

been incomplete. These persons had their first operation before August, 1954—i.e., they had an extrafascial ligation, an operation which we have abandoned for the subfascial exploration, which was done for them. Table III gives the details of the 20 (11.5%) reoperations.

The analysis of the results of ligation of the ankle communicating veins is complicated by the fact that 110 patients had had a previous operation for varicose veins, but their ulcer or disabling symptom had recurred and demanded treatment. It is possible, of course, that the previous control of the superficial varicose veins may have created more auspicious conditions for the operation on the communicating vein to succeed.

Illustrative Case-report

A woman, aged 51, had recurrent eczema and ulceration of one of her legs. In 1949 her long saphenous vein was terminally ligated and injected with a sclerosant. The ulcer recurred. In 1950 a lumbar sympathectomy was done. The limb was warmer, but the eruption reappeared. In 1952 the popliteal vein was divided; temporary improvement followed, but the ulcer recurred the following year. She healed from time to time under pressure-bandaging until 1955, when the ankle communicating veins were divided subfascially. She has a sound supple scar, and her leg has been clear for two years and three months.

Conclusions

Our experience has convinced us that the subfascial ligation of the ankle communicating veins is an advance in the cure of the venous-ulcer syndrome for patients of all ages. We have done it for 2 octogenarisns and produced improvement. Of 96 patients treated for two years or more 90% are satisfactory.

Our procedure differs somewhat from that described by Cockett and Jones (1953) in that we look for more perforating veins. We offer it to all persons if the diagnosis is clear, the skin reasonably stable, and they are mobile and good surgical risks.

We realise that a significant follow-up should extend for at least five years, but the present survey may be of encouraging interest.

I wish to express my warm thanks to Denis Powell, F.R.C.S., who started this follow-up work with me (H. D.).

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OSTEITIS PUBIS AFTER INGUINAL HERNIORRHAPHY

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OSTEITIS pubis has been generally regarded as an orthopædic complication of lower abdominal surgery and is usually the sequel, after a typical latent interval of some weeks or months, to operations on the prostate by any route or on the other pelvic viscera. Muschat's (1945) contention that it occurs "only after operations on the urinary bladder" is far from correct, for it has been described as the sequel, in considerably younger people, to such traumata as those of track-running (Adams and Chandler 1953), normal childbirth, and cæsarean section.

Clinically, two or more weeks after the provocative factor, there is a general disturbance resembling that of a subacute infection—pyrexia, malaise, a rise in erythrocyte sedimentation-rate (E.S.R.), and leucocytosis—accompanied by pubic pain and tenderness exacerbated by movements of the hips and walking and sometimes at opening of the bowels or bladder.

Radiographically, the process begins (a little later, often, than the first clinical features) with superficial erosion of the bony cortex in the symphysial region, followed by widening of the symphysial gap and diffuse osteoporosis spreading down and back to involve the ischial tuberosities. In the healing stage there is consolidation with return of normal density and some new bone formation, occasionally complete fusion across the symphysial fibrocartilage. The whole process may be completed in a month or two or may linger on for years.

Osteitis pubis has been variously attributed to the effects of local trauma to this part of the pelvic girdle, to the results of infection, and to disturbance of the local circulation. Certainly, phlebography in some cases has shown gross dilatation and stasis in the bony sinusoids (Steinbach et al. 1955), but it is not clear whether this is to be regarded as cause or effect. Some cases proceed to frank suppuration; but in these, and whenever sinuses and sequestra appear (and this is usually in the more malignant variety of pubic osteitis after operations on the bladder), one is left wondering whether a distinction should not be drawn at some point between true osteitis pubis and ordinary osteomyelitis of the pelvis.

We here report three cases which followed inguinal herniorrhaphy. Osteitis pubis has not previously, to our knowledge, been reported as a complication of this operation, but inquiry may prove that it is not so rare as one might suppose. In these three cases rest, and rest alone, was of any therapeutic value, although success has been reported with antibiotics, cortisone, and deep X-ray therapy. All three patients recovered completely after several months, and all three cases were remarkably alike in clinical and radiological evolution.

Case-reports

Case 1.—A healthy man, aged 40, had a Tanner slide operation for a right direct inguinal hernia, No. 40 thread being used. The wound healed normally, and he was discharged home on the eighth postoperative day. A few days later he had pains in his legs and, seen in outpatients on the twenty-fifth postoperative day, complained of pain in his right hip and thigh and of difficulty in walking, for which he was treated by physiotherapy. His symptoms became progressively more severe, and six weeks after operation he was in great distress and obviously ill. He had pain in his low-back, pubic, and perineal regions, held himself with great care, and could only walk very gingerly, each step arousing great apprehension. All hip movements which stretched the adductors were painful and resented. He had no pyrexia, but his E.S.R. was 32 mm. in 1 hr (Wintrobe) and his white-cell count was 10,000 (polymorphs 7300) per c.mm. Radiography (fig. 1) showed great widening of the symphysis and regional osteoporosis.

Readmission.—He was readmitted and kept on strict rest in bed for a month, which considerably relieved his symptoms. An intensive course of treatment with oral cortisone and parenteral penicillin appeared to make no difference

Fig. 1—Case 1 six weeks after herniorrhaphy: widening of symphysial gap with blurred margins and regional osteoporosis.

Fig. 2—Case 1 five months after operation: restoration of narrow symphysial cleft and normal density with some juxtasymphysial sclerosis. Superficial excavation of left ischial tuberosity.

Fig. 5—Case 3 before operation: normal bone structure.

to the rate of recovery. As time passed the anterior pubic and perineal pain and tenderness subsided, but great pain over the left ischial tuberosity caused bitter complaint. He could not sit up in bed or on a hard chair because of this, and this symptom was relieved to some extent by local injections of hydrocortisone. He began getting about again four months after his operation and improved steadily, and at five months he was working happily and symptom-free and has remained so. Later radiographs showed restoration of the normal narrow symphysial cleft with juxtasymphysial sclerosis and extensive superficial excavation of the left ischial tuberosity (fig. 2).

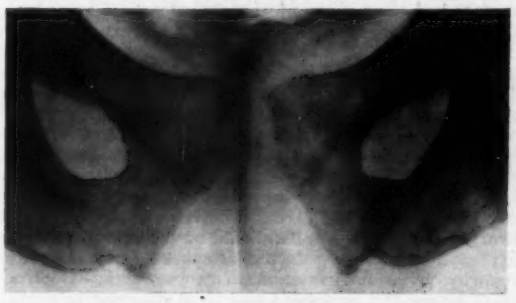

Fig. 3—Case 2 ten weeks after herniorrhaphy: gross widening of symphysis and regional osteoporosis.

Case 2.—A healthy man, aged 32, had a left direct inguinal hernia repaired with braided nylon. He got up on the third postoperative day and was discharged on the sixth. At home pains came on in his thighs and spread by the third postoperative week to his groins and penis, and at six weeks he had such ischial tenderness that he could not sit down. He could only shuffle about with great circumspection and had to stay in bed for a month. When he was referred back to hospital by his own doctor ten weeks after operation, his history, the spasm of the hamstring muscles and the wasting and weakness of the gluteal and thigh muscles pointed to poliomyelitis; but case 1 had alerted us to the true diagnosis, and radiography showed the characteristic changes in the symphysial region (fig. 3). He had no pyrexia, his E.S.R. was 37 mm. in 1 hr. (Wintrobe), and white-cell count 13,000 (polymorphs 9300) per c.mm. At this time three small stitch sinuses appeared in his operation wound, and fragments of nylon were extruded. After three months he began to improve, after four months he returned to work, and after five months he was perfectly well, when radiography (fig. 4) showed a normal symphysial space, local sclerosis, and punched-out areas in both ischial tuberosities.

Fig. 6—Case 3 ten weeks after herniorrhaphy: osteoporosis, symphysis and widening, and ischial erosions.

Case 3.—A healthy man, aged 49, had a Tanner slide operation for a left indirect inguinal hernia and was discharged on the seventh postoperative day. Soon after this he developed pain in his thighs and became so ill, and found getting about so difficult, that he was readmitted three weeks after his operation, his condition being at first regarded as due to some neurological disorder. All movements at both hips

Fig. 4—Case 2 five months after operation: re-narrowing of symphysis with local sclerosis, restoration of normal density of regional bone, and punched-out areas in both ischial tuberosities.

Fig. 7—Case 3 ten weeks after operation: another view to show superficial excavation and formation of new bone.

Fig. 8—Case 3 five months after operation: considerable restoration of normal density but bone architecture is permanently altered and ischial tuberosities are remodelled.

were restricted and painful, he had no pyrexia, his E.S.R. was 29 mm. in 1 hr. (Wintrobe), and his white-cell count was 7000 (polymorphs 5660) per c.mm. After three weeks in bed he was sent home, and later he was seen in the orthopædic clinic, where the resemblance to the preceding cases enabled the diagnosis to be made. A preoperative radiograph of the pelvis showed normal bone structure (fig. 5). Radiography ten weeks after his operation (figs. 6 and 7) showed very extensive changes in the pubes and ischia, including considerable new bone formation, the disease having been recognised at a rather later stage than in the first two cases.

Treatment and Course.—Since the patient still had a great deal of pain and difficulty in walking he was rested at home and treated with cortisone and penicillin, but again these agents did not seem to influence the natural rate of recovery. He improved slowly, with ischial pain persisting for many weeks after all other symptoms had subsided, and local injections of hydrocortisone seemed to offer relief. Walking was still difficult four months after his operation, but by the fifth postoperative month he returned to work. At this time there was radiographic evidence of considerable resolution (fig. 8).

Discussion

Herniorrhaphy—These three patients were operated on within a few weeks of each other by two different surgeons using different techniques. A different nonabsorbable material was used for the inguinal repair in each case. The wounds healed normally at first in all three and remained so in two; in one stitch sinuses appeared after a few weeks and healed promptly after the extrusion of the offending material.

Clinical Features.—In each case the pattern of the illness was very similar. It began in the second or third postoperative week with pain in the low-back, pubic, and perineal regions and upper parts of the thighs, with difficulty in walking, malaise, and general distress. The gait was characteristic, that of a cat on hot bricks. A few weeks after operation the condition had become so severe that a month's rest in bed was required. As the symptoms in the anterior part of the pelvic arch subsided, pain and tenderness developed more posteriorly in the ischial tuberosities. This was so severe that sitting up with the legs straight and sitting in a hard chair were impossible. This ischial pain lingered on for many weeks after walking had become normal.

Radiology.—The radiographic features were also similar. Diffuse osteoporosis of the pubic and ischial rami, with fuzziness and superficial erosion in the juxtasymphysial region and widening of the symphysial gap, were already established when the clinical features drew attention to the disease. Later there were recalcification, restoration of the narrow symphysial cleft, juxtasymphysial sclerosis and some subperiosteal bone formation. At this stage there also appeared destructive changes in the ischial tuberosities.

Recovery.—All three patients had made a complete symptomatic recovery, with radiographic evidence of quiescence, and were walking normally and back at work five months after their herniorrhaphy.

Diagnosis was not easy, for the condition of osteitis pubis did not readily come to mind. Case 1 was originally labelled tuberculosis of the symphysis, case 2 poliomyelitis, and case 3 a lumbar disc lesion or other neurological disorder. Nevertheless, the true state of affairs having been established in the first patient, the two others were recognised as soon as they tottered into the orthopædic clinic. The symptoms listed—malaise, pelvic pain and difficulty and distress in walking, setting in a few weeks after the provocative factor—should immediately suggest the diagnosis.

Treatment.—The final outcome, and the time taken to reach resolution, were the same in all, and it seemed very unlikely that chemotherapy or cortisone exerted the slightest influence on the course of the disease; the progress of case 2, which did not receive these drugs, was identical with that of cases 1 and 3. This finding is in complete contrast with such reports as those of Thornley (1955) that cortisone produces rapid, dramatic, and lasting improvement. Local injection of hydrocortisone, however, did seem to be helpful for the troublesome ischiitis and ischial bursitis. Complete rest in bed was very valuable and the only means of relieving the pain by eliminating most of the gravity strains and muscle pulls affecting the diseased section of the pelvic ring. Rest in bed must also improve the prognosis because, in this disease, every hip movement and every step cause the adductor muscles to contract, pulling on an inflamed soggy periosteum and perhaps adding to the severity and duration of the reactive changes. After the patients got up prolonged physiotherapy was needed to restore full power to the wasted muscles and full movement to the hip-joints. Conservative measures seemed to be all that were required in these patients; but it might have been otherwise if evidence of suppuration had appeared. Our experience would not favour Blauvelt's (1955) view that every case of osteitis pubis should be subjected to surgical exploration of the retropubic space; but the cases reported by urologists seem to be just those which are most severe and persistent and most disposed to sequestration and sinus formation.

Ætiology.—The clinical course (despite the absence of pyrexia), the raised E.S.R., and the high white-cell count all suggest an *infection*. Nevertheless there were no signs of infection of the operation wound in two of the cases, and in the third the short-lived sinuses were of the simple foreign-body type. In no case was there any urinary infection. So far as *trauma* is concerned, a herniorrhaphy inevitably involves dissection at the superior and posterior aspects of the upper pubic ramus, and the innermost repair stitch is deliberately placed to take a good bite of the periosteum here. There was certainly local trauma at the point of origin of the disease. From the *vascular* angle the radiographic evidence is that of a self-limiting disturbance of the circulation within the bone, an initial hyperæmia ending up in final reactive sclerosis, and, if this were all, a disorder of the nature of a Südeck's atrophy—i.e., a local reflex vasodystrophy—might be held to explain everything; but in addition there was destructive subperiosteal excavation (and destruction within the bone in case 3) which is difficult to explain on a simple vascular basis. Added local infection seems to be an essential factor here and, of course, always is so when suppuration develops.

Therefore it seems desirable to attribute the onset of this disorder to a combination of factors. Local trauma plus a low-grade infection together trigger off a spreading upset in the blood-supply of this part of the skeleton, and the relative contribution of the different factors must vary in different cases. This may explain why cortisone is so effective in some cases and useless in others. In case 1 all the radiographic changes are explicable in terms

of simple initial hyperæmia and subsequent ischæmia alone. In cases 2 and 3 the subperiosteal excavation and later formation of new bone resemble the vascular-inflammatory changes in, for example, Paget's disease; and the destruction of bone in the ischia rather suggests a true infection.

Summary

Three cases are reported in which osteitis pubis complicated recovery from inguinal herniorrhaphy.

The disease appeared within a week or two of operation and was of relatively benign type, without suppuration.

All the patients had completely recovered after five months.

In the 2 cases in which it was tried, oral cortisone was without effect on the rate of recovery.

Only a combination of traumatic, vascular, and infective factors appears fully to explain the onset of this disease.

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HÆMOLYTIC DISEASE OF THE NEWBORN

THE FATE OF 246 RHESUS-INCOMPATIBLE PREGNANCIES

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IN 1955 two of us described an investigation into methods of treating infants with hæmolytic disease of the newborn: we compared the results in those treated by induction of labour with the results in those allowed to proceed to spontaneous delivery (Kelsall and Vos 1955). 246 incompatible pregnancies were studied and the immediate mortality-rates given. The conclusion, confirmed by statistical analysis, was that in cases where the Rh-antibody titre of the mother's serum rose considerably in the last five weeks of pregnancy induction of labour gave significantly better results.

Of the original 246 incompatible pregnancies studied after twenty-eight weeks' gestation (table I), no less than 39 (16%) produced stillbirths. (Rh-negative infants have been excluded since they were compatible.) We deal here with the fate of the remaining 207 liveborn infants who were followed up, where possible, to the age of at least eighteen months. 21 of the infants born alive were known to have died within the first year of life. 186 affected babies should therefore have been available for examination by the "follow-up clinic," but 15 could not be found in spite of persistent efforts.

Of these 15, 7 had been so mildly affected that neither simple nor exchange transfusion had been necessary, and they had left hospital at the usual time as normal babies. 8 other untraced infants had been moderately or severely affected and had been treated by exchange transfusion. They had all left hospital in a satisfactory condition.

Wiener (1950) followed 30 of his cases for at least eighteen months, and concluded that by treating infants by exchange transfusion rather than simple transfusion he reduced the neurological sequelæ of erythroblastosis from 16% to nil. He quotes Zuelzer as finding 32% of neurological sequelæ in his cases treated by simple transfusion.

Gerver and Day (1950) applied the Stanford-Binet intelligence-quotient tests to 68 affected children and compared them with 68 of their respective elder, unaffected siblings. They concluded that the intelligence of the affected children was only very slightly inferior to that of the controls. None had signs of motor-nerve damage.

Armitage and Mollison (1953) followed 374 affected infants who survived the first week of life, and found that in 24 (6·4%), signs of damage to the central nervous system developed sooner or later (up to three years).

Jones et al. (1954) followed up many affected infants, but found no evidence of impairment of motor or intellective capacity.

Fatal Cases *

In a previous report (Kelsall and Vos 1955) we included all the known deaths at ages up to one year. It should be emphasised that *all* deaths have been included in the mortality figures, even where double pathology has been found, either ante or post mortem, since we regard blood incompatibility as being a contributory factor leading to the ultimate death of the child.

For example, 1 infant (no. 187) died of hydrocephalus at the age of four months. The mother of this infant had the lowest Rh-antibody titre of any whose baby died—a titre which is usually associated with a mild degree of the disease. Another baby (no. 332) was found to have coarctation of the aorta at necropsy. 1 baby (no. 326) died of septicæmia at home, another (no. 93) had bronchopneumonia, and another (no. 44) was found at necropsy to have a tentorial tear and a ruptured spleen.

Rh-antibody Titres

The greatest number of deaths is associated with a high maternal Rh-antibody titre, as determined by the indirect antiglobulin titration technique. In our experience, when a mother has an antibody titre of 1/1024 or higher, few infants will survive long enough even to be born alive unless premature labour is quickly induced.

Cord Hæmoglobin†

With 2 exceptions (no. 109, a baby with congenital heart-disease, and no. 140, a 2 lb. 11 oz. premature infant), in all the fatal cases the hæmoglobin value was below 14·0 g. per 100 ml. The lowest recorded (2·0 g. in no. 213), was associated with a maternal antibody titre of 1/4096, while in 4 other cases (144, 169, 241, and 271) the content was below 5·0 g.

The Survivors

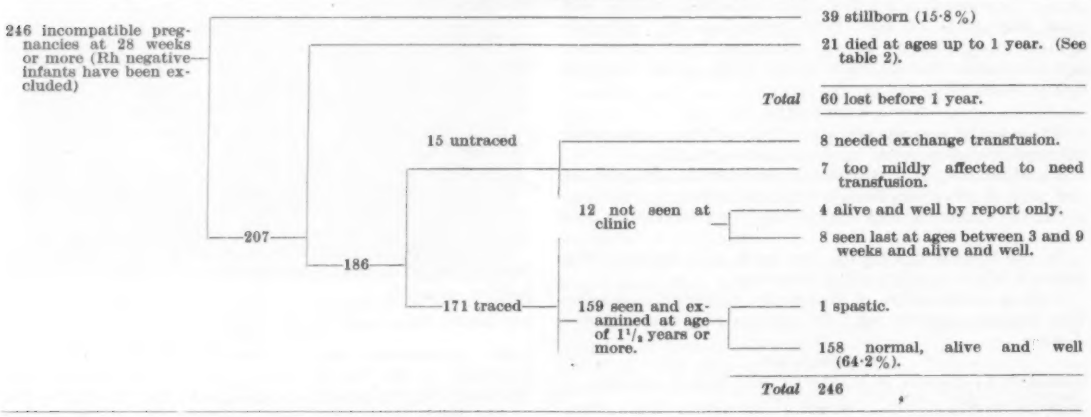
Of 186 babies who survived the neonatal period (table I) 159 were seen at the age of eighteen months or more by a pædiatrician. A further 8 were last seen between three and nine weeks after delivery and were all in good condition. 4 more infants, who were unable to attend the clinic because of the distances involved, were not examined by us but were reported to be in normal healthy condition.

Of the 159 children aged eighteen months or more, 40 were seen twice to confirm previous doubts or observations. The developmental history was taken, and any children whose development seemed retarded, or who were late in passing milestones, were seen at least three times. As in the inquiry reported by Armitage and Mollison (1953), the pædiatricians asked themselves: does the child's development appear normal for its age, and is there evidence of motor damage?

* Details of the fatal cases have been omitted here, but multigraphed copies of a summary may be obtained by application to the Editor, *The Lancet*, 7, Adam St., Adelphi, London, W.C.2.

† Hæmoglobin values were estimated on cord blood samples in a Medical Research Council grey-wedge hæmoglobinometer.

TABLE I—FATE OF BABIES


246 incompatible pregnancies at 28 weeks or more (Rh negative infants have been excluded)
39 stillborn (15·8%)
21 died at ages up to 1 year. (See table 2).
Total 60 lost before 1 year.
15 untraced
8 needed exchange transfusion.
7 too mildly affected to need transfusion.
12 not seen at clinic
4 alive and well by report only.
8 seen last at ages between 3 and 9 weeks and alive and well.
207
186
171 traced
159 seen and examined at age of 1½ years or more.
1 spastic.
158 normal, alive and well (64·2%).
Total 246

We have not attempted to assess the intelligence quotient (I.Q.) of the survivors, as was done by Gerver and Day (1950) With the exception of one spastic baby (see below), the development of all cases seen was within normal range, and there seemed to be no abnormality, intellectual or motor. At eighteen months of age there were at least 158 (64%) normal infants resulting from 246 incompatible pregnancies. It is reasonable to assume that the 4 infants reported to be in good condition were also normal babies, making the figure 162 (66%).

The history of the spastic child was as follows :

A baby was born on July 3, 1952, by spontaneous delivery at 39 weeks' gestation, his birthweight being 6 lb. 9 oz. His mother had had a normal baby alive and well in 1950, and one stillborn at eight months' gestation in 1951.

The maternal Rh-antibody titre by the indirect Coombs technique was 1/1024, when we first saw the mother and baby four days after spontaneous delivery. The baby had severe jaundice ; the serum-bilirubin was 32·6 mg. per 100 ml. and the hæmoglobin level 12·9 g. per 100 ml. The infant's condition was poor, with opisthotonus, irritability, and generalised œdema.

Exchange transfusion was performed when the infant was ninety-eight hours old. 950 ml. of freshly collected, heparinised blood was transfused into the saphenous vein at the ankle and 900 ml. recovered from the radial artery at the wrist. For several days, head-retraction and jaundice persisted and the baby refused to feed.

He was seen again at the follow-up clinic on May 31, 1955, when two years and eleven months old. He had not sat up until eighteen months old, but now stood, holding on to a chair. Athetoid movements were still in evidence ; he spoke only single words and had minor convulsions, not associated with fever, which were controlled by regular phenobarbitone.

We believe that a significant contributory factor in this poor result was that the child was not seen until he was four days old.

4 other children seen at the follow-up clinic had green-stained teeth but no other abnormality.

Transfusions

164 infants were given transfusions : 162 of these were exchange and 2 simple transfusions. In every exchange transfusion the cord route was attempted ; in 4 cases, where this failed through technical difficulties, the transfusion was given into the saphenous vein at the ankle and the outcoming blood was recovered from the radial artery at the wrist. The transfusion was always started as soon as practicable after delivery. Usually this was within three hours, but the longest elapsed time since delivery was six days ; even here the cord route was used. The blood was freshly collected into heparin solution (250 I.U. per 100 ml. of blood) and incubated at 37°C. until ready for use ; it passed through warming coils before entering the cord. The blood used was of the same ABO group as the infant's and of the same Rh type as the mother's, and the volume transfused was 150–250 ml. per pound of body-weight.

We have used the same technique for cord exchange transfusion in all cases and they have been done by the same person or under his immediate supervision. When the umbilical route was used, a glass cannula attached to a 'Nylex' catheter was passed into the umbilical vein for about 6·5 cm. and blood was exchanged in 50 ml. volumes by means of a 50 ml. syringe. We normally aim at a positive balance of blood in the child because this greatly facilitates the procedure. With this technique in the past six years no baby has died on the table, though before 1950 many were lost when banked citrated blood was used.

Discussion

The loss of 60 viable infants, either as stillbirths or as postnatal deaths, from 246 incompatible pregnancies, despite treatment, is a challenge. The losses before the attainment of "legal" viability must necessarily be accepted because little can as yet be done to salvage the non-viable fœtus.

What of the survivors ? What morbidity and wastage are likely among them ? How many are to survive as useful citizens and how many as an incubus to their unfortunate parents for the rest of their lives as spastic or retarded children ? One has often pondered the wisdom of the efforts to save such children if they are to survive only for a life of dependent imbecility or backwardness. Better perhaps that we had not been quite so successful in our attempts to save them, if such is to be their fate. From the inception of our interest in this disease in 1943 and until 1951, in very many of the patients treated the results were extremely disappointing. Although we have practised exchange transfusion since 1945, it is only within the past five years that we feel that we have really made any advance. These results show that if the infant is watched antenatally, delivered when indicated, and adequately treated postnatally, very few retarded or imbecile children need be expected.

The results of what progress there is may be found in the eighteen-month follow-up of the treated infants. All but 1 of the children seen at the follow-up clinic were apparently normal healthy children. We still do not know what will be their fate in ten or twenty years, but we know of several severely affected babies treated in 1943–45 who have now no visible abnormality. Is there any disease of later life which is the sequel of hæmolytic disease of the newborn ? As yet the question cannot be answered, because the disease has been discovered too

TABLE II—246 VIABLE INFANTS OF INCOMPATIBLE PREGNANCIES. FATE ACCORDING TO TREATMENT AND MATERNAL INDIRECT COOMBS TITRE

					Maternal indirect Coombs titre range and case numbers for neonatal deaths	
Induced	Stillbirths	3			1 case less than 1/128 (prolapsed cord). 2 others 1/512 or higher (one toxæmia of pregnancy, one hydropic fœtus). These infants died soon after induction.	Total wastage 15 = 12·9%
	Exchange Transfusion	109	Survived	99	Indirect Coombs titre range for all, 1/128 or higher.	
			Neonatal deaths	10 = 9·1%	Case 187 (1/128), case 326 (1/256), case 44 (1/1024), case 93 (1/4096), case 155 (1/1024), case 175 (1/4096), case 197 (1/2048), case 216 (1/2048), case 245 (1/1024).	
	No exchange Transfusion	4	Survived	2	Both less than 1/128—induced for toxæmia of pregnancy.	
			Neonatal deaths	2 = 50·0%	Case 332 (1/1024), case 169 (1/4096).	
Spontaneous	Stillbirths	36			Indirect Coombs titre range for these cases was 1/512 or higher.	Total wastage 45 = 34·6%
	Exchange Transfusion	55	Survived	51	Indirect Coombs titre range for these cases was 1/128 or higher.	
			Neonatal deaths	4 = 9·0%	Case 192 (1/256), case 212 (1/2048), case 213 (1/4096), case 271 (1/2048).	
	No exchange Transfusion	39	Survived	34	Indirect Coombs titre range for these cases was 1/128 or less.	
			Neonatal deaths	5 = 12·7%	Case 109 (1/512), case 140 (1/512), case 154 (1/1024), Case 241 (1/2048).	
	Total	246				

recently and the relevant antenatal and neonatal data do not exist for older people. We therefore plead that all the relevant records of affected children should be retained so that they may be available even in their old age.

The infants in this series were delivered either spontaneously or by induction of labour before term. Both groups were treated by exchange transfusion, with the same methods, blood-preparation, and technique. The ultimate outcome of the survivors at eighteen months shows no difference between the induced and spontaneous groups.

We have never accepted the dictum that induction of labour has no place in the management of hæmolytic disease of the newborn. Indeed, it has been our belief that many potential stillbirths may be prevented by induction, and the published evidence of others is now confirming this contention (Walker et al. 1957, Fisher 1957). If all cases are considered from thirty-five weeks onwards (a critical point of time at which viability really commences), then those babies prematurely induced and treated after this time because of incipient danger have survived to eighteen months of age as well as those delivered spontaneously after thirty-five weeks' gestation. Induction has no apparent, enduring, long-term detrimental effect visible at eighteen months. In this series, the induced babies were worse risks and more severely affected than those that were spontaneously delivered (table II).

They were more premature.

Labour was deliberately induced when the maternal antibodies were rising to dangerously high levels. Many of the infants, whose mother's serum had an antibody titre of 1/2048 or more, were pale limp " rag dolls " at delivery.

Of the 94 spontaneously delivered infants, 34 were so mildly affected that neither exchange nor simple transfusion was needed and only 55 needed exchange transfusions; but of the induced cases, only 2 babies both induced for an incidental toxæmia of pregnancy needed no treatment, and 109 needed exchange transfusions.

The worst cases in the spontaneous group had already been lost as stillbirths (36 cases as opposed to 3 in the induced group).

The largest remaining question for most workers is the indication for induction of labour. Some (Walker et al. 1957, Fisher 1957) have pinned their faith to a family history of previous stillbirths and neonatal deaths, and consolidated such leanings when the father has proved to be homozygous Rh-positive. We feel, however, that to rely on an unfavourable history alone is a wrong approach, reminiscent of the law which allowed a savage dog to bite you once before you destroy it. Moreover, experience shows that heterozygous fathers are also very likely to beget stillborn and severely affected babies once the mother has been sensitised, and conversely, that the homozygous father of a stillborn infant may sire a mildly affected infant subsequently. We feel that the first stillbirth, or even serious case, in a family should be prevented where possible, and therefore a better indication than " previous history " must be found.

As evidence of severe hæmolysis in the fœtus we have looked for methæmalbumin (Fairley 1941) in the maternal blood antenatally. But though methæmalbumin can readily be detected spectroscopically in the infant's blood after delivery, none can be detected antenatally in the mother—even in the severest cases.

The failure of this led again to our following the antenatal changes in the maternal antibody titre. As we have shown (Kelsall, Vos, Kirk, and Shield 1957) the maternal antibody titre possesses the real advantage of giving an antenatal prognosis of severity, and can be used as a guide in timing early induction of labour when the antibodies show clear indication of rising to a high level, and thus reduce the hazards to the child of prolonged exposure to the antibodies " in utero".

Summary

In 1951–54 246 Rh-incompatible pregnancies were observed from twenty-eight weeks' gestation until delivery. 39 (15·8%) babies were stillborn, and 207 were born alive.

21 of these liveborn babies died subsequently, and 186 survived for at least fourteen days. 15 of the survivors were untraced after they left the hospital; 171 were traced and asked to attend the follow-up clinic. 159 attended, and were examined by a pædiatrician, when eighteen months of age or older.

158 (64·2% of 246) were normal children; 1 was abnormal. An additional 11 infants were not seen at the follow-up clinic but are believed to be in satisfactory condition. 27 children, though normal when they left hospital, did not report to the clinic. Their fate at eighteen months is not known.

Where labour was induced prematurely, the infants survived as well as those delivered spontaneously, in spite of the fact that they were more seriously affected and more premature.

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PROTRACTED URICOSURIC THERAPY IN TOPHACEOUS GOUT*

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THE outlook for the patient with gout has been substantially improved in recent years, notably as regards the control of chronic gouty arthritis resulting from tophaceous deposits. The formation of new tophi can be halted, and established tophi made to disappear, by protracted treatment with suitable uricosuric agents (Yû and Gutman 1951). The increased urinary excretion of urates so induced lowers the serum-urate level and reverses the flow of urate from circulating fluids to tissues. A prolonged state of negative urate balance supervenes, and the body pool of urate, including solid deposits, is thus reduced.

This treatment was given to 82 patients with tophaceous gout, who received sustained therapy with uricosuric drugs for from six months to seven years (table I). In no instance did new tophi appear once the uricosuric regimen was fairly instituted and maintained. In 36 patients the tophi already formed were much diminished in size or disappeared completely (figs. 1 and 2); in 31 the response was unequivocal but only moderate or slight; and in 15 there has been no apparent change in the size of tophi (treatment in 11 of these instances, however, had lasted less than a year).

Impaired function of one or more joints, due to chronic gouty arthritis, was present in 52 patients. In 37 there was complete resolution of joint disability, and in 12 improvement was either moderate or considerable. Chronic joint pain, present in 52 patients, was completely relieved in 47 and somewhat improved in 3.

Analysis of the cases showing little or no change in the size of tophi indicates that the causes of failure may be classified in two groups: (1) inadequate uricosuric response and lowering of the serum-urate level, due to impaired renal function, to insufficient dosage because of drug intolerance or precipitation of renal colic, or to immoderation in diet; and (2) adequate uricosuric response and disappearance of some but not all of the patient's tophi (fig. 2). Some tophaceous deposits apparently are inaccessible to humoral agents, perhaps because of poor vascularisation, and therefore are refractory. These points are advantageously discussed in connection with the specific uricosuric drugs used.

Uricosuric Agents

Salicylate

The potent uricosuric properties of salicylates in large dosage have been recognised and intermittently used in the management of gout for more than seventy-five years. This, therefore, was the first drug we tried in protracted daily dosage, with substantial reduction in the size of tophi in 3 cases (Yû and Gutman 1951). Marson (1952, 1953, 1954, 1955) has recorded many additional successes with salicylate.

The large dosage required for effective uricosuric response—about 5 g. or more daily, the uricosuric effect usually being potentiated by concurrent administration of large doses of sodium bicarbonate—inevitably induces the discomforts of salicylism. Prolonged treatment for many months or years, such as is required, exposes the patient to the hazard of grave metabolic, mental, hæmorrhagic, and other disturbances which reflect the toxic effects of protracted administration of salicylate. How-

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Fig. 1—Tophi: *a*, in 1952; *b*, in 1957.

Fig. 2—Tophi: *a*, in 1952; *b*, in 1957. Note disappearance of tophi of hands and wrists, and reduction in size of right olecranon bursa, with no change in left olecranon bursa.

TABLE I—MOBILISATION OF TOPHI BY PROTRACTED USE OF URICOSURIC AGENTS IN 82 CASES OF TOPHACEOUS GOUT (PROBENECID 55 CASES, G-25671 22 CASES, G-28315 2 CASES, SALICYLATE 3 CASES)

Duration of therapy (yr.)	No. of cases	Reduction in size of tophi		
		No change	Slight or moderate	Considerable or complete
½–1	27	11	10	6
1–2	21	2	14	5
2–3	13	2	3	8
3–4	10	0	1	9
4–5	6	0	2	4
5–7	5	0	1	4
Total	82	15	31	36

ever, unlike those of cinchophen (another uricosuric agent disqualified by its untoward reactions), the toxic effects of salicylate disappear fairly quickly when salicylate is withheld.

Probenecid

This currently is the most widely used uricosuric agent, and was chiefly used to accomplish the results summarised in table I. Data on the uricosuric potency of probenecid have been recorded in detail elsewhere (Gutman 1950, Gutman and Yü 1951, 1955, Sirota et al. 1952, Gutman et al. 1954). The incidence of drug toxicity, even with prolonged use, is low. Of 169 gouty patients treated with probenecid 8 (5%) developed drug rash and 13 (8%) complained of severe gastric distress. No serious toxic effect on bone-marrow, liver, or other organ was observed in our seven-year experience of probenecid; but fatal massive necrosis of the liver was reported in a patient who continued to receive probenecid despite warning allergic reactions (Reynolds et al. 1957).

With probenecid, even in a daily dosage of 2 or 3 g., it is impossible to lower the serum-urate level below 7 mg. per 100 ml. in a substantial proportion of gouty patients, notably those with overt renal damage (table II). Probenecid is devoid of antirheumatic and analgesic

TABLE II—EFFECT OF PROBENECID ON SERUM-URATE LEVEL OF GOUTY PATIENTS (186 OBSERVATIONS IN 122 PATIENTS)

Serum urate (mg. per 100 ml.)	No. of cases before probenecid therapy	No. of cases on probenecid therapy
10·1–14	65 (*35%*)	1 (*<1%*)
8·1–10·0	91 (*49%*)	19 (*10%*)
7·1– 8·0	26 (*14%*)	32 (*17%*)
6·1– 7·0	4 (*2%*)	54 (*29%*)
<5·1– 6·0	0	80 (*43%*)

properties, a handicap when severe joint stiffness or chronic pain resists the concurrent administration of prophylactic colchicine, since relief is obtained only after some months, when the urate deposits in the joint tissues have been sufficiently mobilised. Probenecid also tends to provoke attacks of acute gouty arthritis when it is first administered, as in 17 of our patients.

Phenylbutazone Analogues

G-25671, which contains a phenylthioethyl group in place of the butyl side-chain of phenylbutazone, and G-28315, the sulphoxide of G-25671, have been tried as uricosuric agents (Brodie et al. 1954, Yü et al. 1956, Burns et al. 1957). These compounds, notably G-28315, are more potent than probenecid (table III) and effectively lower the serum-urate level and mobilise tophi in some cases resistant to probenecid. G-25671 possesses also mild analgesic properties sufficient to afford prompt relief of joint stiffness and pain in most patients with chronic gouty arthritis who suffered discomfort when treated with probenecid. These phenylbutazone analogues rarely provoke acute gouty seizures.

The side-reactions so far observed have been similar in kind and incidence to those observed with probenecid: drug rash (in 4 of 65 patients given G-25671; none as yet in those taking G-28315); and severe gastric distress (in 5 patients of 65 given G-25671 and 2 of 30 patients given G-28315), all disappearing promptly when these drugs were withheld. G-25671 has been in regular use for three years, and G-28315 for more than a year. The more serious side-reactions of phenylbutazone were not observed with these analogues but, of course, much more extensive and prolonged experience will be needed to establish the incidence of these hazards.

Regulation of Dosage

Because of great individual variations in response to uricosuric medication, the optimal drug and its dosage are best established by direct measurement in the candidate for therapy. The 24-hour urinary excretion of urate and the serum-urate level are determined while the patient is taking a low-purine low-fat restricted-protein (60–80 g. a day) diet; a standard daily dose of the preferred uricosuric agent is administered; the urine-urate and serum-urate levels are redetermined, and the dosage is adjusted accordingly. The optimal dosage of probenecid was 0·5 g. a day in 10% of our patients, 1·0 g. a day in 50%, 1·5–2·0 g. a day in 25%, and 2·5–3·0 g. a day in 15%. Of G-25671 about 10% of our patients take 0·4–0·6 g. a day, 70% take 1·0 g. a day, and 20% take 2·0 g. a day. The usual dosage of G-28315 is 0·4–0·6 g. a day.

TABLE III—COMPARISON OF URICOSURIC EFFECTS OF PROBENECID, G-25671, AND G-28315

Drug	Dosage (g. daily)	No. of patients	Mean urinary excretion of urate (mg. per 24 hr.)		Change (%)
			Before medication	On medication	
Probenecid	0·5	13	528	695	+32
	1·0	39	581	831	+43
	1·5	12	556	841	+51
G-25671 ..	1·0	25	503	856	+70
G-28315 ..	0·4	13	528	905	+71

The uricosuric effect desired depends on individual circumstances. Ordinarily, regulation of dosage is aimed at effecting a 50–100% increase in the daily urinary excretion of urate and the lowering of the serum-urate level to normal (less than 6 mg. per 100 ml.). These objectives may not be attainable, particularly in gouty patients with renal damage and extensive tophi; but a negative urate balance, with disappearance of tophi, appears to be attainable in many cases when the serum-urate level remains about 7 mg. per 100 ml. When there is a history of recurrent renal stone or renal colic, dosage should be limited to the minimum required to produce modest uricosuria; and, in general, excessive increase in urinary excretion of urate should be avoided. The degree of dietary restriction of purines, proteins, and fats which can or should be imposed must also be taken into account.

Start and Finish of Uricosuric Therapy

There is no unanimity of opinion about when, in the course of gout, uricosuric prophylaxis is most appropriately initiated. Only about half the overtly gouty patients have large enough deposits of urate to be visible as tophi—46% of previously published 702 cases collected by McCracken et al. (1946) and 39% of our own 415 gouty patients—and fewer still ever develop significant deformity or disability due to chronic gouty arthritis. Moreover the interval between the first attack of acute gouty arthritis and the appearance of tophi, if they do develop at all, is usually several years. Consequently the administration of uricosuric drugs to all gouty patients early in the course of their disease, for purposes of prophylaxis, would inevitably involve unnecessary or premature medication in most cases. We prefer usually to withhold uricosuric agents until there is some indication of early tophi, when they can be dis-

persed and further deposition prevented. Joint stiffness is occasionally the first manifestation of more diffuse urate infiltration requiring uricosuric medication.

The duration of the uricosuric response depends largely on the magnitude of the mobilisable deposit of urate. When this is depleted, the dosage may be reduced, or the drug withheld, for periods depending on the rate of reaccumulation of urate deposits. This varies from months to years in different patients and must be estimated for each patient individually.

Dubious Uses of Uricosuric Agents

Uricosuric drugs have no place in the treatment of acute gouty arthritis. It is well established that lowering the serum-urate level to normal does not relieve the acute attack; indeed, such lowering may be associated with precipitation of acute gouty arthritis, at least when probenecid is used. Uricosuric therapy, when indicated, is best introduced in the intercritical phase of gout, after stabilisation with prophylactic colchicine.

There is none the less a widespread belief that probenecid, given prophylactically, can prevent recurrence of acute gouty arthritis by keeping the serum-urate level normal. This view doubtless stems from the time-honoured presumption (of doubtful validity) that acute gouty arthritis is caused by a sudden precipitation of uric-acid crystals in the joint tissues. To be sure, some gouty patients treated with probenecid alone remain free from attacks for some time. The recurrence of acute gouty arthritis is so unpredictable, however, that generalisations about the prophylactic value of a drug should be made only after it has been assessed in large series of gouty patients observed over a considerable number of years. Our own experience supports the prophylactic value of colchicine (0·5–1·5 mg. a day orally, the dosage being adjusted to individual requirements) but does not substantiate the efficacy of probenecid in the prevention of recurrence of acute gouty arthritis: 27 patients, who took colchicine and probenecid regularly, discontinued probenecid without recurrence of acute gouty arthritis; but 9 patients who discontinued colchicine prophylaxis developed recurrent acute attacks and had to resume daily colchicine, again with good response.

Finally, uricosuric agents sometimes are administered to patients with non-tophaceous gout simply to lower high serum-urate levels to normal. In undertaking this laudable attempt the disadvantages of protracted uricosuric medication should be weighed against the advantages of maintaining normal serum-urate levels. It is readily conceded that restoration of normal blood levels is likely to bring a warm glow of accomplishment to patient and physician alike.

Any discussion of the use of uricosuric agents should not be concluded without mention of a danger common to all such drugs, that of precipitating renal colic or the formation of urate calculi. The danger is greatest in those patients who have or have had stones or who give a history of repeated renal colic. Uricosuric agents therefore should not be prescribed in such instances unless distinctly indicated, and then, as already mentioned, in the lowest effective dosage, with a large intake of fluid and, when the urine is persistently acid, perhaps with sodium bicarbonate or other alkalinising agent. Flank pain or passage of urate stone or gravel occurred in 15 of our patients receiving probenecid (11 of these with a history of such difficulties before treatment) and in 6 of those receiving G-25671 (4 of these giving a similar history). This hazard, then, is not excessive but must be taken into account, and the importance in this connection of selecting appropriate cases, of moderation in drug dosage, and of large intake of fluids should be emphasised.

Summary

82 patients with tophaceous gout were given uricosuric agents for periods varying from six months to seven years. Analysis of the results supports previous findings indicating that tophaceous deposits can be prevented and, when present, can usually be made to diminish in size or to disappear.

The advantages and limitations of several uricosuric agents—probenecid, two phenylbutazone analogues (G-25671 and G-28315), and salicylate—are described.

The indications for the use of uricosuric agents are defined.

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THE REINFORCEMENT OF TENDON-REFLEXES

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THE reinforcement of sluggish or absent reflexes, usually by having the patient pull firmly at his interlocked hands, is so widely used that it is surprising that little attention has been given to its mechanism. It is often assumed that the procedure merely takes the patient's mind off his legs and allows them to relax, or that, on the contrary, it removes cortical inhibition from the appropriate anterior-horn cells. Sommer (1940) reported a simple and elegant experiment which suggested a different and more interesting mechanism, but his work appears to be little known in this country, and we are unaware of any attempts to confirm his findings.

We confirm Sommer's findings and report here some related observations.

Method

The experimental arrangement is indicated in fig. 1. A reproducible blow could be delivered to the Achilles

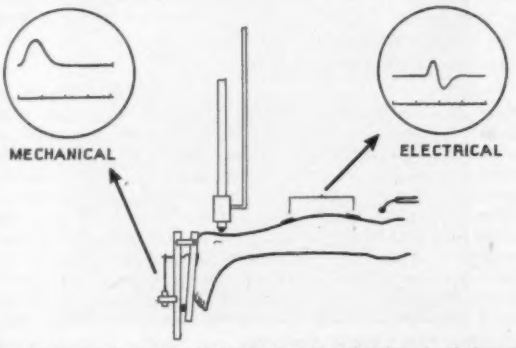

Fig. 1—Arrangement for eliciting ankle-jerk either by stimulation of afferent nerves in popliteal fossa or by blow on tendon. Both mechanical and electromyographic response could be recorded.

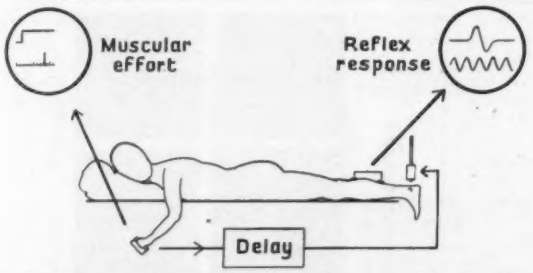

Fig. 2—Arrangement for eliciting ankle-jerk at controlled time after start of reinforcing effort.

tendon of the prone subject by a solenoid-driven hammer. Alternatively the medial popliteal nerve could be stimulated by surface electrodes. Electrical response of the gastrocnemius and soleus muscles was detected by surface electrodes, and mechanical response by a spring-loaded hinged footplate actuating a mechano-transducer valve.

8 sec. was allowed to elapse between the control and the reinforced response, because it has been shown that at shorter intervals the second response is depressed (Buller and Dornhorst 1955).

Results

Manœuvres Effective in Reinforcing Mechanically Induced Reflexes.—It was found that a firm grasp by either hand was sufficient, as were other upper-limb movements involving effort. It is likely that any effort is effective that does not involve specifically inhibitory movements—e.g., neck extension.

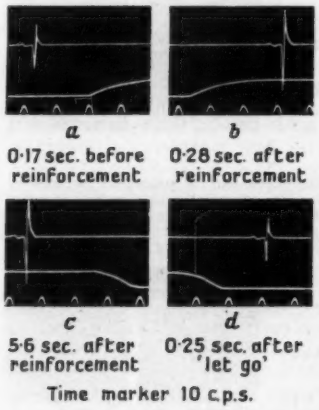

Fig. 3—Lower trace, deflexion shows hand-grip; upper trace, electromyogram of reflex: a, reflex precedes effort, no reinforcement; b, reflex during beginning of grip, reinforced; c, still reinforced with continuing effort; d, return to normal at end of effort.

Temporal Relation Between Effort and Effect.—This was investigated by the device indicated in fig. 2. The subject squeezes a spring-loaded grip. The resulting movement was recorded electrically and, after an adjustable delay, automatically brought about the blow by the tendon hammer. The reinforcement appeared immediately and persisted unchanged with continuing effort for as long as it was followed—i.e., 6 sec. It disappeared promptly on relaxation (fig. 3).

Sommer Experiment.—If the stimulus to the medial popliteal nerve is not too intense, the afferent and not the efferent fibres are excited, and, as shown in fig. 4, a pure reflex response is evoked (Magladery et al. 1951). The Sommer experiment consists of comparing the effects of the reinforcing manœuvre on this electrically induced reflex response with the effect on the usual mechanically induced reflex. The results were clear cut: there is no reinforcement of the electrically induced reflex (fig. 5).

Other Effects of Reinforcement.—In some people reinforcement caused a transient clonus to follow a mechanical stimulus. As briefly reported elsewhere (Buller and Dornhorst 1955), the second of two electrically evoked reflexes separated by 0·2–0·3 sec. is normally depressed; and reinforcement abolishes the depression. Although a reinforcing manœuvre causes no detectable activity in a relaxed muscle, when a person is contracting the muscle at a steady rate (making a pointer coupled to the footplate follow another moving pointer), the same manœuvre accelerates the movement.

Discussion

The significance of the Sommer experiment is that it shows that reinforcement is not effected by enhancement of the sensitivity of the anterior-horn cells but presumably by increasing the response of the stretch receptor to the mechanical stimulus. The mechanism that can achieve this is the small motor nerves supplying the specialised

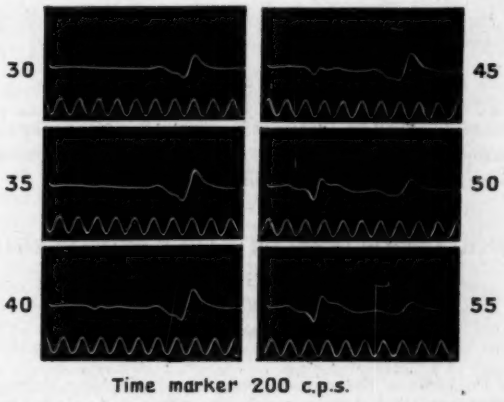

Fig. 4—Electromyographic response to electrical stimulation of popliteal nerve (stimulus strength at side of each trace in arbitrary units): at low strength pure reflex response is seen, about 30 m.sec. after stimulus artefact; with increasing strength direct response appears and reflex is occluded.

muscle-fibres within the muscle spindles. The activity of these intrafusal fibres controls the amount of stretch necessary to fire the sensory endings of the spindle. There is now much evidence for the view that at least some activity is initiated via the small motor fibres, the monosynaptic reflex acting as a servo-mechanism to bring the muscle to the length set by the intrafusal fibres (Eldred et al. 1954). Presumably, when a healthy person has no tendon-jerks at rest, small-fibre activity is absent or minimal, the intrafusal fibres are slack, and the small stretch caused by a blow on the tendon does not initiate an afferent volley. An effort capable of reinforcing a reflex then acts by an associated small-fibre activity taking up slack in the spindles of inactive muscles—perhaps a postural " get-set " reaction.

The other features associated with reinforcement described above are consistent with this account.

The importance of this mechanism is that it offers a

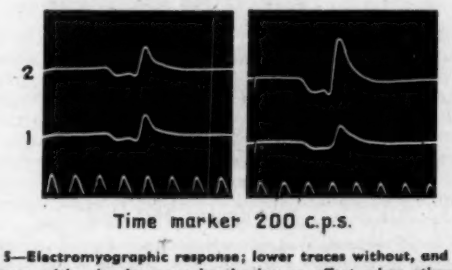

Fig. 5—Electromyographic response; lower traces without, and upper traces with, simultaneous hand-grip: no effect when stimulus is electrical; reinforcement when mechanical.

test of small-fibres control : gross disturbance of the small motor system should lead to loss of the ability to reinforce. Buller 1957 shows that this is the case in the early stages of hemiplegia.

Summary

The effect of a reinforcing effort on the ankle-jerk elicited by mechanical and electrical stimulation has been studied.

Reinforcement does not affect the sensitivity of the anterior-horn cells but appears to act on the small motor system and intrafusal muscle-fibres. This confirms the results of Sommer (1940).

The reinforcing movement is not critical but must involve effort. The effect begins at once and persists throughout the effort.

Reinforcement affords a means of testing the integrity of the small motor system.

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THE ANKLE-JERK IN EARLY HEMIPLEGIA

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FOLLOWING the sudden onset of a hemiplegia there is often a period during which the affected limbs exhibit hyper-reflexia without hypertonus ; indeed at this stage the muscle tone may even be diminished. Observations of the ankle-jerk have been made during this phase in an attempt to localise the site of the increased excitability responsible for the hyper-reflexia.

Methods

The position of the patient and the apparatus used were as described by Buller and Dornhorst (1957). In addition a technique for the application of a conditioning stimulus followed, after a variable interval, by a test stimulus was also used (Buller 1955, Buller and Dornhorst 1955).

Procedure

Each patient was examined on several occasions. In each instance photographic records were made of the reflex electrical and mechanical responses to both electrical stimulation of the medial popliteal nerve and mechanical stimulation of the tendo Achillis. Strength-duration curves were constructed for both sides, and no differences in excitability of the motor fibres between normal and abnormal sides were found. On both the normal and the hemiplegic sides the electrical stimuli were then adjusted to an intensity which produced a reflex response but was just short of that necessary to produce direct stimulation of the motor fibres (see Buller and Dornhorst 1957, fig. 4). Mechanical stimuli were adjusted to give maximal reflex responses under the constant loading conditions used.

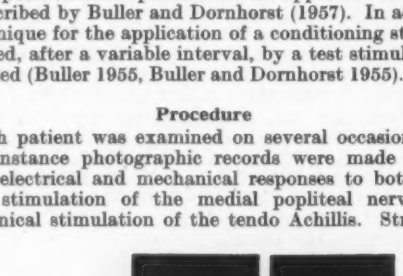

Fig. 1—Reflex responses from gastrocnemius-soleus group of muscles in healthy person: upper 2 tracings, reflex response to tap on tendo Achillis; lower 2 tracings, reflex response to electrical stimulation of medial popliteal nerve.

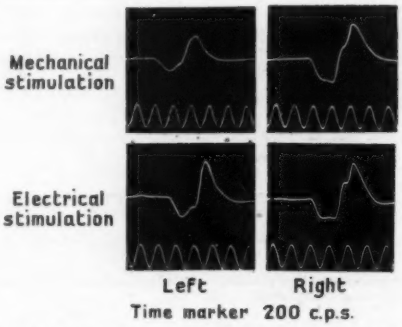

Fig. 2—As in Fig. 1, but from patient with right hemiplegia.

Reinforcement was accomplished by the method described by Buller and Dornhorst (1957), the patient using the healthy hand irrespective of which ankle-jerk was being recorded. In healthy people reinforcement with one hand produces comparable changes in both ankle-jerks.

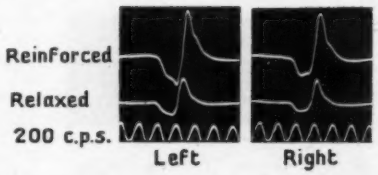

Fig. 3—Reinforcement of ankle-jerk in healthy person: note similar increase in size of reflex responses on both sides during reinforcement with left hand.

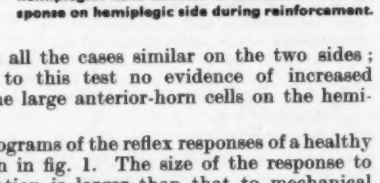

Fig. 4—As in fig. 3, but from patient with right hemiplegia: note absence of increased reflex response on hemiplegic side during reinforcement.

Material

Five cases were investigated : three following presumed cerebral hæmorrhage, one following cerebral embolus secondary to subacute bacterial endocarditis, and one following carotid-artery thrombosis.

Results

The reflex responses to the standardised electrical stimulus were in all the cases similar on the two sides ; there was thus to this test no evidence of increased excitability of the large anterior-horn cells on the hemiplegic side.

The electromyograms of the reflex responses of a healthy person are shown in fig. 1. The size of the response to electrical stimulation is larger than that to mechanical stimulation, and this was usually the case. In the records illustrated here fortuitous placing of the recording electrodes has produced nearly identical records on each side for each type of stimulation. Although comparable electrode positions on the two sides were attempted, not all the records were so well matched, and a comparison was always made of the *relative* size of the response to electrical and mechanical stimulation. In fig. 1 the ratio between the size of the reflex response to mechanical stimulation

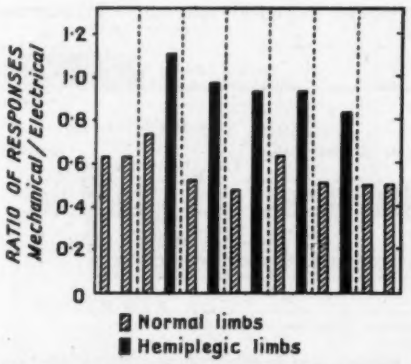

Fig. 5—Comparison between ratios of size of reflex response to mechanical stimulation and size of reflex response to electrical stimulation on two sides of two healthy people and five hemiplegics: note ratios are same on each side for healthy people but larger on the hemiplegic side of patients.

and the size of the reflex response to electrical stimulation is seen to be the same on both sides.

Fig. 2 illustrates a comparable series of responses from a patient with right hemiplegia. It shows that the ratio between the size of response to mechanical stimulation and the size of response to electrical stimulation are different on the two sides, that on the abnormal side being the larger. This well-marked difference was found in all the hemiplegics examined and in no healthy subject. This is illustrated in fig. 5.

Fig. 3 illustrates the reinforcement of both ankle-jerks of a healthy person squeezing with his left hand.

Fig. 4 illustrates comparable records from a hemiplegic patient. Reinforcement produces augmentation of the response on the healthy side, but not on the paralysed side. All 5 patients showed this absent or diminished augmentation of response on the affected side.

In the two cases examined by a conditioning shock followed by a test shock to the medial popliteal nerve a well-marked difference between the normal and the affected sides was found. The behaviour of the affected side was similar to that of a healthy limb during reinforcement (Buller and Dornhorst 1955).

Discussion

The results reported here show that there is no increased excitability of the large anterior-horn cells to a standardised afferent nerve volley on the hemiplegic side. However, the reflex response to a standardised blow on the tendo Achillis is greater on the hemiplegic side. This suggests that, for the standardised blow, a greater excitatory afferent discharge is produced from the hemiplegic side, and that this increased afferent discharge may arise from primary annulospiral endings within the stretched muscle spindles. The reason for the increased sensitivity of the muscle spindle to stretch may well be increased intrafusal muscle-fibre activity, itself the result of increased small nerve-fibre activity. If this is so, it would appear that the hyper-reflexia of the hemiplegic limbs is brought about by a mechanism comparable to that producing the enhanced tendon-reflexes shown by many healthy persons on reinforcement (Buller and Dornhorst 1957). The inability of the present patients appreciably to enhance their tendon-reflexes on the hemiplegic side suggests that the intrafusal fibres could not be further activated under the conditions studied.

All five patients exhibited ankle clonus. This might also be a result of an increased intrafusal muscle-fibre activity which, while enhancing the discharge from the primary spindle endings, might also decrease the discharge from spindle secondary endings. Evidence that these secondary endings produce central inhibitory influences during the restretching of muscle has been briefly reported elsewhere. (Buller and Dornhorst 1955.)

The result of examination of hemiplegic patients emphasises the apparent independence of tendon-reflex responses and muscle tone. The independence of the dynamic and static phases of the stretch reflex in a healthy man has also been noted by Hammond (1954). The patients here reported were examined while they had normal or reduced muscle tone on clinical examination. Preliminary observations suggest that the excitability of the large anterior-horn cells remains comparable on the healthy and the hemiplegic sides even after the advent of hypertonus; but it must be emphasised that the method described measures only the sensitivity of the anterior-horn cells to a transient afferent volley. With a longer-lasting afferent inflow the anterior-horn cells would also come under the influence of feedback via the Renshaw loop (Renshaw 1941, Holmgren and Merton 1954) and possibly other intramedullary connections. The "net excitability" of the anterior-horn cells subjected to a sustained afferent volley together with local feedback control may vary considerably with observed changes in muscle tone. This problem has been discussed in general terms by Buller (1956) and is under examination.

Summary

The reflex responses to a blow on the tendo Achillis and to an electrical stimulus to the medial popliteal nerve were studied in healthy people and in hemiplegic patients.

No increased excitability of the large anterior-horn cells was found on the affected side of the hemiplegics.

The increased reflex response to mechanical stimulation of the hemiplegic limb is attributed to a "resetting" of the muscle spindles, as accompanies reinforcement of the tendon jerks in a healthy person.

I have to thank Dr. J. Forest Smith and Dr. R. E. Kelly for access to patients in their care.

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NEOMYCIN IN THE TREATMENT OF HEPATIC COMA

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IT seems probable that the syndrome of hepatic precoma and coma in patients with liver disease is often related to the absorption of toxic substances from the gut, especially if there is a large portal-systemic collateral circulation (Phillips et al. 1952, McDermott and Adams 1954, Sherlock et al. 1954). These substances are probably derived from bacterial action on nitrogenous material (Silen et al. 1955).

Precipitation of hepatic coma by oral *dl*-methionine in some patients with liver disease may be prevented or retarded by giving chlortetracycline (aureomycin) (Phear et al. 1956), and hepatic coma has been treated by withdrawal of dietary protein, purgation, and oral chlor-

TABLE I—EFFECT OF NEOMYCIN SULPHATE ON PATIENTS WITH CHRONIC NEUROPSYCHIATRIC COMPLICATIONS OF HEPATIC CIRRHOSIS

Case no.	Age (yr.)	Sex	Portal collateral circulation	Neomycin		Neurological grade		E.E.G. grade		Fasting arterial-blood-ammonium (μg. per ml.)				Fetor hepaticus	
				Dosage (g. per 24 hr.)	Duration	Before	During	Before	During	Before	During 1 wk.	During 1 month	During 4 mos.	Before	During
1	39	M	Umbilical vein*	4–10	10 mos.	II	O	C	B	2·4	0·4	1·1	1·8	+	−
2	52	M	Spleno-renal IVC*	8	10 wk.	II	O	D	O	2·0	0·6	0·9	..	+	−
3	44	M	Portacaval operation	4–8	4 mos.	II	O	D	B	2·2	0·8	1·1	1·9	+	−
4	39	M	"	8	5 mos.	II	O	D	B	2·0	0·6	1·2	1·6	+	−
5	46	F	Spleno-renal IVC*	6	4 mos.	I	O	B	B	1·4	1·1	1·2	1·4	+	−
6	56	F	Portacaval operation	6	3 wk.	I	O	C	B	1·6	0·7	..	..	+	±
7	45	F	Spleno-renal IVC*	8	1 wk.	I	I	A	A	1·0	0·4	..	..	+	−
8	65	F	Lumbar*	8	1 wk.	I	I	C	C	1·2	0·4	..	..	−	−

* Natural shunts shown by transsplenic portal venography (Atkinson et al. 1955).

tetracycline with encouraging results (Sherlock et al. 1956). Patients with cirrhosis and relatively good liver function but with a large portal-systemic collateral circulation may have chronic neuropsychiatric symptoms and are much improved by continued restriction of dietary protein (Summerskill et al. 1956). As liver function is impaired further, even complete protein withdrawal may prove ineffective. It is in this group that an attempt may be made to suppress gastro-intestinal bacterial growth by long-term antibiotic treatment.

Oral neomycin is the obvious choice, for it is very effective in decreasing the gastro-intestinal formation of ammonia (Fisher and Faloon 1956), an index of bacterial action on proteins; resistant *Escherichia coli* are uncommon (Poth et al. 1951); little is absorbed (Poth et al. 1950); and only one instance of complicating staphylococcal enteritis has been reported (Pettet et al. 1955). Fisher and Faloon (1956) have given neomycin for eighty days to a patient with cirrhosis and chronic neuropsychiatric signs and increased the protein tolerance. They also report that neomycin lowered the blood-ammonium levels in patients with cirrhosis (Fisher and Faloon 1957).

We have treated 12 patients with acute hepatic coma and 8 with chronic portal-systemic encephalopathy (intermittent stupor) with neomycin for periods up to ten months and observed the clinical state, blood-ammonium levels, and bacteriology of the stools. Of the 20 patients 19, of whom 5 were chronic alcoholics, had cirrhosis of the liver and 1 acute viral hepatitis.

Methods

The dosage of neomycin was 4–10 g. daily. Patients with the chronic syndrome received a constant protein diet with vitamin supplements throughout the observation period. Patients with acute hepatic coma were also treated by complete dietary protein withdrawal enemata, blood-transfusion, and the Sengstaken œsophageal compression tube. This urine was treated frequently for albumin.

The *neuropsychiatric disability* of the patients was assessed as follows:

Grade I: personality changes with or without neurological abnormality, gross façade of patient preserved.

Grade II: advanced confusion and disorientation.

Grade III: stuporose or comatose.

Ammonium was estimated on arterial blood from the fasting patient by a slight modification of Conway's (1950) microdiffusion method (Phear et al. 1955).

The *electroencephalogram* was graded A-E (Parsons Smith et al. 1957).

Fæces were quantitatively examined for bacteria as follows:

200 mg. of fresh fæces was weighed on a clean piece of radiographic film and placed in a bottle containing 100 ml. of 0·85% sodium-chloride solution + 2% broth. The contents of the bottle were homogenised by shaking for an hour at 270 oscillations a minute at 37°C. Standard loopfuls (0·01 ml.) of this suspension and dilutions of 1 : 100 and 1 : 1000 in saline solution + 2% broth were spread evenly over plates of blood-agar, blood-agar containing 6% agar (Hayward and Miles 1943), and McConkey's medium. These were incubated for forty-eight hours aerobically, and similar blood plates were incubated anaerobically in a Fildes-McIntosh jar containing 5% CO_2. This method does not detect numbers of bacteria less than 10,000 per gramme.

Results

CHRONIC NEUROPSYCHIATRIC DISORDER (table I, figs. 1–3)

6 patients with portal cirrhosis and an extensive portal-systemic collateral circulation had experienced chronic neuropsychiatric symptoms for three months to three years. Restriction of their dietary protein to 25–50 g. daily had not controlled their symptoms; so neomycin 4–10 g. daily was given for three weeks to ten months. Within a week of the start of treatment the "flapping" tremor disappeared, coordination improved, and there was increased ability to perform mental-function tests. In case 3 maximal benefit was only noted after three weeks. Improvement was maintained while neomycin was given except in case 1, who relapsed after ten months' continuous treatment.

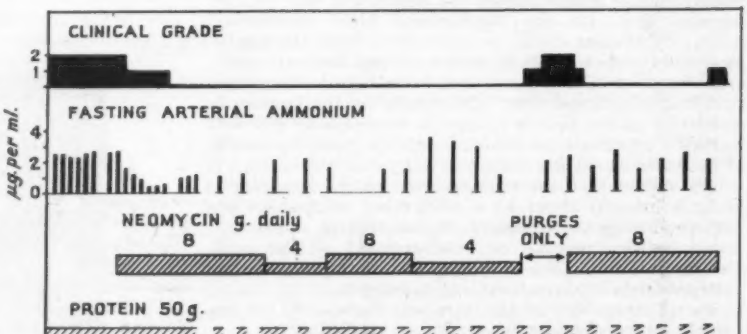

Fig. 1—Case 1: effect of neomycin sulphate on clinical course and fasting arterial-blood-ammonium levels.

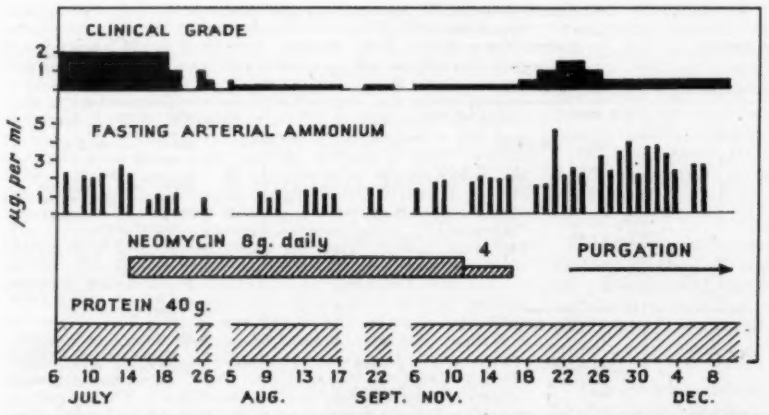

Fig. 2—Case 3: effect of neomycin sulphate on clinical course and fasting arterial-blood-ammonium levels.

In cases 7 and 8 neomycin was given for a week as a therapeutic test, but there was little change, and the symptoms were minimal. Treatment with neomycin was then discontinued.

Within three days of the start of neomycin therapy, fetor hepaticus disappeared in 6 of the 7 patients in whom it was present.

In 3 patients neomycin therapy was stopped: after ten weeks in case 2; after four months in case 3; and after ten months in case 1. Symptoms returned within a week in cases 1 and 3. During the ten weeks' neomycin therapy case 2 showed improvement in liver function, with disappearance of spider nævi, a rise in serum-albumin level from 2·4 to 2·9 g. per 100 ml., and a fall in serum-bilirubin level from 2·5 to 1·2 mg. per 100 ml. When neomycin therapy was stopped, his symptoms were controlled by restriction of dietary protein and by mild purgation.

The electroencephalogram usually, but not always, reflected the clinical improvement, but a normal record was achieved only in case 2.

Within a week the fasting arterial-blood-ammonium level fell to normal in 7 of 8 patients studied; this was followed by a gradual rise, with the result that in 4 patients at four months it approached pre-neomycin levels although the clinical benefit continued.

EFFECT OF NEOMYCIN ON STOOLS (table II)

The stools became bulky, pale, and usually odourless.

The fæcal flora of 8 patients with the chronic syndrome and 3 patients with acute coma were studied. In 9 of these 11 patients within two days *Esch. coli* ceased to grow. In cases 2 and 4 *Esch. coli* persisted and was resistant to neomycin in virto; a 3rd patient showed resistant *Esch. coli* after a week's treatment. *Esch. coli* was not found during neomycin therapy that lasted ten months in case 1, four months in case 3, and three weeks in case 6.

Streptococcus fæcalis was grown during the first week from 2 of the 11 patients, after the first month from 1 of 4 patients, and after four months from 3 of 4 patients. Bacteroides did not grow in the first week from 5 of the 11 patients; in only 1 of these was treatment continued, and bacteroides remained absent for four months. Yeasts were grown from 5 of the 11 patients during the first week, and in 1 they appeared after a month. In 2 of these patients yeasts disappeared although the neomycin therapy was continued. Micrococci appeared during the first week in 2 patients, and after four months in 1 patient. Diphtheroids appeared during a week's treatment in 2 patients. At no time was *Staphylococcus pyogenes* isolated from the fæces.

Case 1 continued to have neomycin for ten months, and the stool flora was then essentially the same as at four months.

In 4 patients studied the fæcal flora had returned to the pretreatment picture within a week after neomycin therapy had been discontinued.

The clinical state, blood-ammonium levels, and abolition of fetor hepaticus could not be correlated with the observed alterations in fæcal flora.

EFFECT OF PURGATION

In 3 patients a senna preparation and liquid paraffin were used to induce a stool volume and frequency similar to that found when taking neomycin. Case 1, when the neomycin was replaced by purgation, relapsed from neurological grade O to grade II and the fasting arterial-blood-ammonia level showed little change (fig. 1). Cases 3 and 4, who had not received neomycin recently, when purged improved from a neurological grade II to mild grade I and the electroencephalogram from grade D to grade B (figs. 2 and 3). The arterial-blood-ammonium level showed little change in case 3,

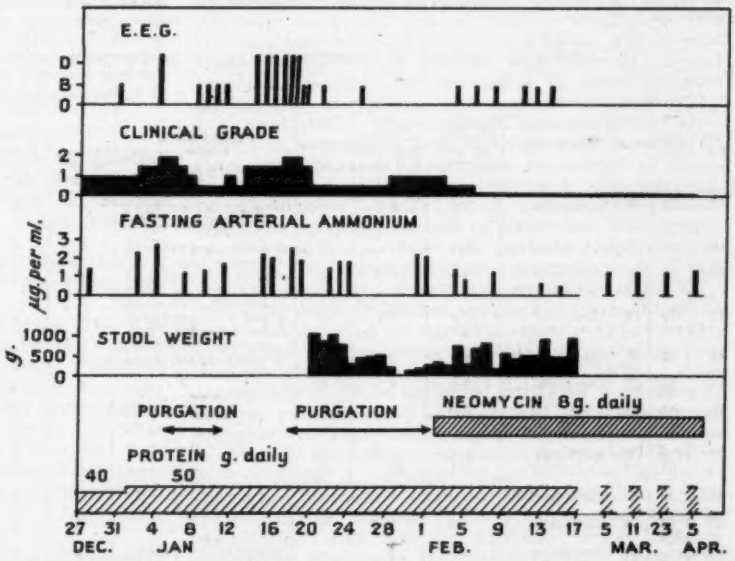

Fig. 3—Case 4: effect of neomycin sulphate on clinical course, electroencephalogram, and fasting arterial-blood-ammonium levels.

TABLE II—EFFECT OF NEOMYCIN ON STOOL FLORA OF PATIENTS WITH CIRRHOSIS

Case no.	*Esch. coli*			*Strep. fæcalis*			Bacteroides			Yeasts			Remarks
	1 wk.	1 month	4 mos.	1 wk.	1 month	4 mos.	1 wk.	1 month	4 mos.	1 wk.	1 month	4 mos.	
1	O	O	O	O	O	1×10^5	4×10^8	$7{\cdot}5 \times 10^9$	$9{\cdot}5 \times 10^9$	O	O	O	Micrococci appeared after 4 mos.
2	$8{\cdot}5 \times 10^7$	$1{\cdot}5 \times 10^9$	..	O	O	..	6×10^8	$7{\cdot}5 \times 10^9$	..	O	O	..	*Esch. coli* resistant to neomycin in vitro
3	O	O	O	O	O	$3{\cdot}5 \times 10^6$	6×10^6	$7{\cdot}5 \times 10^9$	7×10^9	O	O	O	..
4	3×10^7	$1{\cdot}5 \times 10^6$	2×10^7	O	O	O	$6{\cdot}1 \times 10^9$	4×10^9	2×10^7	O	$1{\cdot}1 \times 10^6$	O	*Esch. coli* resistant to neomycin in vitro
5	O	$2{\cdot}8 \times 10^6$	6×10^6	O	7×10^6	$2{\cdot}3 \times 10^7$	O	O	O	9×10^7	O	O	*Esch. coli* resistant on eighth day
6	O	..	..	3×10^6	..	..	$1{\cdot}5 \times 10^9$	..	..	$2{\cdot}7 \times 10^6$	..	..	Diphtheroides appeared during neomycin therapy
7	O	..	..	O	..	..	O	..	..	$1{\cdot}35 \times 10^6$	..	..	Diphtheroides appeared during neomycin therapy
8	O	..	..	O	..	..	$4{\cdot}5 \times 10^9$	..	..	O	..	..	..
9	O	..	..	2×10^7	..	..	O	..	..	O	..	..	Micrococci grown during neomycin therapy
10	O	..	..	O	..	..	O	..	..	4×10^7	..	..	Micrococci grown during neomycin therapy
15	O	..	..	O	..	..	O	..	..	3×10^8	..	..	..

O, below limit of counting method.

but in case 4 it tended to fall. In this latter patient purging was repeated and preceded by an enema, and within six hours the electroencephalogram had changed from grade D to grade C and the fasting arterial-blood-ammonium level had fallen from 2·3 to 1·4 μg. per ml. The régime had to be stopped in this patient because of nausea, vomiting, and abdominal cramps.

Fetor hepaticus was present in all 3 patients during purgation.

ILLUSTRATIVE CASE-REPORTS

Case 1 (fig. 1).—In 1945 a man, aged 39, was found to have splenomegaly, and an epigastric venous hum was heard. He remained well until March, 1954, when he became increasingly tired and tremulous and could not do fine manual work. He was irritable and paranoid and had uncontrollable outbursts of violence. In August, 1954, he was bedridden and was admitted to hospital confused, disoriented, and unable to give a history. He was tremulous at rest, muscle tone and tendon-reflexes were increased, and ankle clonus was elicited. There were excessive salivation and a very strong fetor hepaticus. Biochemical tests were virtually normal, with serum-albumin level 3·7 g. per 100 ml., serum-bilirubin level 0·8 mg. per 100 ml. Liver biopsy showed portal cirrhosis, and transsplenic venography a huge patent umbilical vein shunting blood from the left branch of the portal vein into the systemic circulation.

Treatment and Progress.—Improvement rapidly followed complete withdrawal of dietary protein and a course of chlortetracycline, and he was discharged taking a diet containing 50 g. of protein. He remained at full-time work until January, 1956, when he started to lose time, until by April he was again having psychotic outbursts. He was readmitted to hospital, and there was little improvement on a 20-g. protein diet. On May 28 he was deteriorating slowly on a 50-g. protein diet, and treatment with neomycin 8 g. daily was started. Within three days the fetor hepaticus and tremor had disappeared and he had improved mentally. After a week he felt fitter than at any time since 1954. Between June, 1956, and April, 1957, he received neomycin and worked fulltime without tremor. In December the dosage of neomycin was decreased to 4 g. daily with no ill effect. On Jan. 12 the neomycin was stopped and replaced by purgatives. After a week the patient felt nervous and depressed, tremor had returned, and he could not do fine soldering, and after two weeks he could not shave himself and had an ataxic gait. Treatment with neomycin 8 g. daily was restarted, and within a week the symptoms were again under control, and he was working normally, although arterial-blood-ammonium levels were never normal. In April, 1957, symptoms reappeared although there had been no change in the fæcal flora. He is now receiving further hospital treatment.

Case 3 (fig. 2).—In December, 1954, this ex-Army private had a portacaval anastomosis for recurrent hæmatemeses

TABLE III—EFFECT OF NEOMYCIN SULPHATE ON PATIENTS WITH ACUTE HEPATIC COMA

Case no.	Age (yr.)	Sex	Diagnosis	Serum-albumin (g. per 100 ml.)	Serum-bilirubin (mg. per 100 ml.)	Ascites	Precipitating factor	Neomycin		Grade of coma		Remarks
								Dosage (g. per 24 hr.)	Duration (days)	Before	During	
9	32	M	Cirrhosis	2·4	1·2	+	Gastro-intestinal hæmorrhage + operation	8	7	III	O	Died 4 mos. later from gastro-intestinal hæmorrhage
10	69	F	,,	2·8	10	+	Gastro-intestinal hæmorrhage	6	7	III	I	Continued to bleed and died 5 days later
11	53	M	Cirrhosis + Hepatoma	2·5	10·2	+	Gastro-intestinal hæmorrhage + portal-vein thrombosis	6	5	I	O	Continued to bleed and died 5 days later
12	69	M	Cirrhosis*	2·4	7·2	+	Gastro-intestinal hæmorrhage + portal-vein thrombosis	8	4	I	III	Died after 4 days, bleeding not controlled
13	53	F	Cirrhosis	3·1	2·0	+	Gastro-intestinal hæmorrhage	8	½	III	III	Progressive coma, died same day
14	53	F	Cirrhosis	2·2	8	+	..	8	6	III	I	Died 1 week later after paracentesis
15	56	M	Cirrhosis*	2·7	2·2	+	..	8	5	III	O	Died 2 mos. later from gastro-intestinal hæmorrhage
16	9	M	Cirrhosis	1·7	1·1	+	..	8	5	II	III	Died
17	57	M	Cirrhosis*	2·1	16	+	..	8	5	III	I	Died, terminal gastro-intestinal hæmorrhage
18	56	F	Cirrhosis*	2·9	8·2	−	..	8	1	II	..	Severe diarrhœa, neomycin therapy stopped
19	41	M	Cirrhosis*	1·9	8·6	+	..	8	1	II	..	Severe diarrhœa, neomycin therapy stopped
20	..	F	Hepatitis	3·2	5	−	Morphine gr. ¼ given for delirium	8	7	III	O	Fully recovered

* Alcoholic patient.

from œsophageal varices complicating cirrhosis. Three weeks later a "flapping" tremor developed and he became noisy, foolish, and difficult to control. In May, 1955, a 40-g. protein diet brought about some improvement, but he did not keep to this diet. He was incoherent and would steal the baby's milk and fly into rages when reprimanded. His habits became dirty and childish. In February, 1956, he was certified insane. In the mental hospital he received a 40-g. protein diet and glutamic acid 20 g. daily and for periods of three or four days was given glucose only, but with no improvement. In June, 1956, on admission to Hammersmith Hospital, he was hypomanic, did not sleep at night, and wrote incessant letters (five within two hours in multicoloured inks). "Flapping" tremor was pronounced, with increased muscle tone and tendon-reflexes and sustained ankle-clonus. Fetor hepaticus was intense.

Treatment and Progress.—After a week on a 40-g. protein diet neomycin 8 g. daily was added, and in three days fetor hepaticus had gone, tremor was minimal, and the clonus had disappeared. Within a week there were no abnormal neurological signs, and the patient had improved mentally and was sleeping soundly at night. After three weeks he was discharged home and continued to receive neomycin 8 g. daily. On the second follow-up admission in November, 1956, his general practitioner wrote that he was better mentally than at any time since his operation. Neomycin was stopped, and after a week he became tremulous and stuporose, and fetor hepaticus was pronounced. Purgation brought about some improvement, but mild mental changes persisted. The patient went home for Christmas, but within three weeks his neuropsychiatric state deteriorated further, and he was readmitted. Despite protein withdrawal and further neomycin he died in hepatic coma.

Case 4 (fig. 3).—In July, 1956, a labourer, aged 39, with cirrhosis of the liver, had a portacaval anastomosis for recurrent hæmatemeses from œsophageal varices. Eighteen days later he became drowsy during the day and light-headed, with the result that people thought he was drunk, and two weeks later he lapsed into coma. His symptoms were initially controlled by restriction of dietary protein, but by December, 1956, a 25-g. protein diet was associated with sluggish thought, poor mental-function tests, and constructional apraxia (Davidson and Summerskill 1956). He was admitted to Hammersmith Hospital, and after five days on a 50-g. protein diet he lapsed into grade-II precoma.

Treatment and Progress.—Purgation was started, and after a week he had improved to grade-I precoma, although fetor hepaticus persisted. When purgation was stopped he again deteriorated; with further purgation he again improved, but this was not maintained, and continued purgation brought about disabling colic, nausea, and occasional vomiting. The purges were stopped, and neomycin 6 g. daily was given. After three days the fetor disappeared, and within a week there were no clinical evidences of hepatic precoma. Four weeks later the patient started full-time work as a porter and felt fitter than at any time since his operation. He continues to take neomycin and remains fit (November, 1957).

ACUTE HEPATIC COMA (table III)

In 5 patients the coma was precipitated by bleeding from œsophageal varices. In 6 patients there was no overt precipitant, although the presence of jaundice and ascites suggested that liver-cell failure was the main factor.

In 2 patients severe diarrhœa came on within six hours of the start of neomycin therapy, which was stopped within twenty-four hours.

6 patients improved from deep coma (grade III)—3 to mild confusion (grade I), and 3 to normality—and 1 patient improved from grade I to normality. 2 of these 7 patients continued to bleed and died twelve days later but passed into deep coma only a few hours before death; 1 other of the 7 patients died a week later after paracentesis abdominis; 2 others died two and four months later from a further gastro-intestinal hæmorrhage; and the patient with severe hepatitis completely recovered

COMPLICATIONS

Albuminuria was never detected.

The severe watery *diarrhœa* that came on in 2 patients with acute hepatic coma (see above) within six hours of the start of neomycin therapy, which had to be discontinued, was thought to be due to the direct action of neomycin, because the diarrhœa ceased within twenty-four hours of the stopping of the treatment. 2 patients in the chronic group (cases 2 and 5) had abdominal distension and mild diarrhœa for three days but were persuaded to continue with the treatment, and their bowel function became regular.

Oral moniliasis developed in case 5 but cleared under local treatment although neomycin treatment was continued.

Discussion

Treatment with neomycin has proved to be a satisfactory method of controlling neuropsychiatric changes in patients with hepatic cirrhosis and a large portal collateral circulation. Neomycin is useful not only in controlling symptoms when the restriction of dietary protein has failed but also in allowing a larger intake of protein.

The obvious clinical improvement was reflected in the electro-encephalogram, although in only 1 case did the tracings become completely normal. These patients had experienced symptoms for some months before treatment; so possibly they had sustained permanent damage to the brain such as may complicate hepatic coma (Adams and Foley 1953); but a mildly abnormal electro-encephalogram is common in patients with liver disease and no neuropsychiatric signs (Parsons-Smith et al. 1957).

The success of neomycin treatment confirms the suggestion that some product of bacterial action on protein in the intestine is at least partly responsible for neuropsychiatric changes in patients with liver disease. Blood-ammonium levels reflect the escape of intestinal putrefactive products into the systemic circulation, and under treatment with neomycin, whether or not ammonium is the toxic substance, the levels might be expected to fall. A decrease was noted during the first week of treatment, confirming the observations of Fisher and Faloon (1957). Later, however, the blood-ammonium levels gradually rose sometimes to pre-neomycin levels; but in only 1 patient was the rise reflected in a recurrence of neuropsychiatric symptoms. This suggests that, although ammonium may be harmful to such patients, it is not the main naturally occurring toxic substance.

It was also extremely difficult to correlate the clinical improvement with bacteriological changes in the fæces. Although *Esch. coli* was not usually detected by the counting methods used, a resistant strain was isolated from the fæces of 3 patients who clinically showed excellent results. The emergence of these resistant strains was unexpected but has been described by Poth et al. (1951). The occasional disappearance of some strains of bacteroides is in keeping with the work of Cohn and Longacre (1956). The appearance of *Strep. fæcalis*, micrococci, and diphtheroides is not surprising, because Clancy (1951) found many gram-positive organisms partially resistant to neomycin. The appearance of candida in half the patients examined was unrelated to gastro-intestinal dysfunction and did not warrant the routine use of nystatin (Range et al. 1957). Neomycin certainly did not sterilise the gastro-intestinal tract, and many of the organisms remaining are known to be capable of producing ammonia and probably other toxic substances (Phear and Ruebner 1956). This discrepancy might be explained partly by a decrease in absolute numbers or by an alteration in the capacity of organisms resistant to or under the influence of the antibiotic to break down nitrogenous substances. Further work is needed on the effect of antibiotics on the metabolism of bacteria. More satisfactory results might theoretically be achieved if the neomycin were used in combination with another antibiotic active against bacteroides, the major resistant organism. Long-term tetracycline therapy should probably be avoided because of the negative nitrogen balance which it induces

(Gabuzda et al. 1952). Bacitracin and chloranquinedel (Cohn and Longacre 1957) might be useful.

Neomycin usually causes two or three loose stools a day. Its beneficial effects might have been related merely to this purgative action. Drastic purgation alone produced some clinical and electro-encephalographic improvement in 2 patients and a fall of blood-ammonia level in 1. The effect, however, was not so dramatic as with neomycin and could not be sustained, because the treatment was too vigorous for continued use. The value of enemata and routine purgation in patients with hepatic coma must, however, be re-emphasised. Fetor hepaticus, which disappeared under neomycin therapy, was unaffected by purgation—which fact supports the suggestion that this fetor is due to a substance formed by bacterial action in the gut.

Patients with the chronic syndrome are relatively uncommon, but with the increase in the number of portacaval shunt operations, can be expected to become commoner. Months or years may elapse between the anastomosis and the onset of symptoms. These may develop when liver-cell function diminishes in the natural history of cirrhosis.

In acute coma neomycin seemed a useful treatment, but many other forms of therapy were being applied simultaneously, and controlled observations were impossible. Neomycin therapy in acute coma is based on the good results obtained in the chronic syndrome. The eventual fatal outcome reflects poor liver function. Poor results would be expected in such patients (Sherlock et al. 1956).

No complications were observed during prolonged therapy with neomycin. Albuminuria was not seen, because neomycin, although nephrotoxic, is absorbed only slightly from the gut. Staphylococcal enterocolitis was not seen, and staphylococci were not isolated from the fæces; these organisms are usually sensitive to neomycin.

Neomycin is expensive, 8 g. daily costing £19 a week in hospital; 4 g. may well be an adequate maintenance dose. A liquid, less refined, but cheaper preparation proved as effective as the usual tablets. It would have been difficult to conduct this trial without generous gifts of the antibiotic. Although its routine use is necessary in acute coma, continuation over many months may prove financially impossible. However, such patients with the chronic syndrome in whom restriction of dietary protein is ineffective are rare, and it is difficult to withhold neomycin if it means the difference between chronic invalidism and productive work. Attempts must be made to stop treatment with neomycin, but in many instances it will have to be resumed. Patients with continuing deterioration of liver function may eventually prove refractory to this treatment.

Summary

8 patients with cirrhosis and chronic portal-systemic encephalopathy and 12 patients with acute hepatic coma were treated with neomycin sulphate 4–10 g. daily from ten hours to ten months.

6 chronic patients showed pronounced clinical benefit, which was associated with a fall in the fasting arterial-blood-ammonium level and an improvement in the electro-encephalogram. 1 patient relapsed after ten months' treatment. Fetor hepaticus was abolished in 6 of 7 chronic patients.

The fasting arterial-blood-ammonium level rose gradually under treatment with neomycin.

The effect on the stool flora was variable and could not be correlated with the clinical benefit or with the fall in arterial-blood-ammonium level.

Purgation induced a partial remission in 2 patients but was not so effective as neomycin.

7 of 12 patients with acute hepatic coma showed initial improvement, but other forms of treatment were used simultaneously.

Neomycin treatment had to be stopped in 2 patients owing to severe diarrhœa.

We wish to thank Dr. B. Ruebner for his bacteriological advice in the early stages of the work; the Medical Research Council for a maintenance grant to one of us (J. McL.); Messrs. E. R. Squibb and Sons for financial support and gifts of the liquid neomycin preparation; and Messrs. Upjohn of England Ltd., for supplying us with neomycin tablets.

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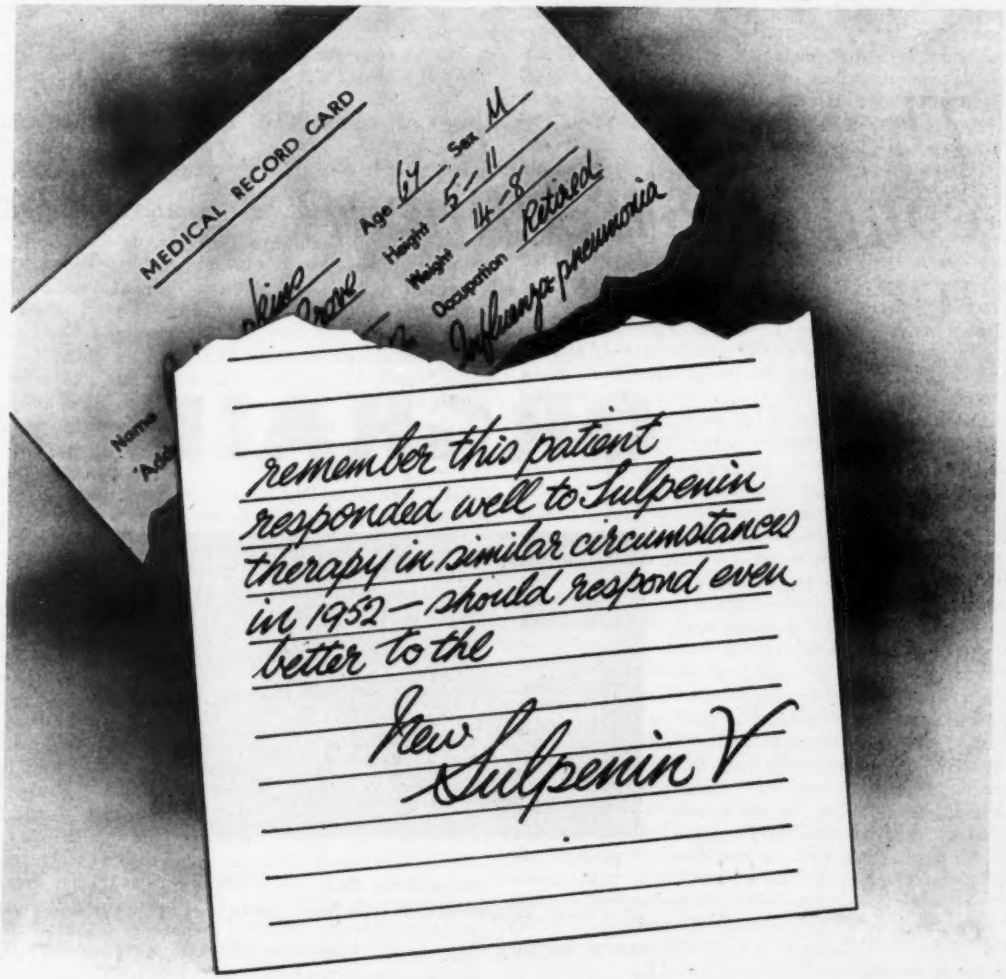
Reviews of Books

The Early Diagnosis of the Acute Abdomen (11th ed. London: Oxford University Press. 1957. Pp. 188. 18*s*.).—After 36 years "Zachary Cope" (it is a significant tribute to the book's value that it is known thus to students everywhere) has had a face-lift—in this case the type face. The general appearance is thus improved while the number of pages is reduced despite the addition of new material. The only scars to be seen are in the adaptation of the original drawings by A. K. Maxwell to the new size and format. The radiographic reproductions, on the other hand, are improved. This famous work has also received embellishment in the form of extra chapters on the grouping of symptoms and on acute abdominal symptoms due to vascular lesions.

Closed Treatment of Common Fractures (2nd ed. Edinburgh and London: E. & S. Livingstone. 1957. Pp. 256. 50*s*.).—Manipulative arts are difficult to teach save by actual demonstration, and in the treatment of fractures even instruction by demonstration has its limitations; for often a senior surgeon is able to prove to a junior colleague that it is possible to improve the position of a difficult fracture, without either of them understanding quite how it is done. This impasse in teaching young surgeons prompted Mr. John Charnley to write this book, one of the most successful of its kind yet published. It describes carefully and lucidly the elementary mechanics of reduction and immobilisation, and shows how the commonest injuries can be managed by proved methods based on these general principles. When first published in 1950, the book was very well received. The new edition, which incorporates additional material collected by Mr. Charnley for an American lecture tour, will be as widely studied as its predecessor—and not only in the junior residents' common-room. Many experienced orthopædic surgeons will want to read it, and though some may disagree with Mr. Charnley here and there, few of them will put the volume down without discovering some modification of technique that would improve their results.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In a recent clinical article (J.A.M.A., 1957, 163, 1115) it was stated that in a series of 2,511 cases in which 28 agents were tested in the symptomatic treatment of migraine, ergotamine tartrate was proved to be the most useful drug—and 81% of the patients showed improvement when ergotamine tartrate and caffeine were compounded with belladonna alkaloids. Orgraine applies the same successful principles of treatment.

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Hospital Treatment: a Changing Scene

A PROFOUND change has come over hospital treatment in the past two decades, causing a quickening tempo and demanding deeper understanding. Formerly empiricism gave a once-and-for-all quality to treatment; the "honorary" could visit the hospital daily, or even twice a week, and dictate treatment to be carried out by the house-physician until his next visit. But nowadays treatment is a continuous process which in the serious case may alter from hour to hour according to the dictates of blood chemistry, endocrinology, and bacteriology.

In few conditions is this better exemplified than in ulcerative colitis. Surgery now has an undisputed place in its treatment; but removal of the colon and the institution of an efficient ileostomy are minor achievements beside that of guiding the patient to safety during the surgical episode. Even before operation the patient's blood chemistry is seriously deranged, owing to diarrhœa, with considerable depletion of potassium and loss of protein, which may be aggravated by liver damage. The preparation for operation involves intravenous restitution, checked and counter-checked against plasma estimations until the circumstances for operation are as favourable as they can be made. After operation the strain of sodium loss due to the ileostomy must be assessed and effectively countered. The patient having previously received cortisone, corticosteroid cover must be maintained over the operative period to avoid collapse. This predisposes to serious infection in what is a highly septic condition, and furthermore attenuates the clinical manifestations of infection so that blood-culture must be undertaken at the slightest suspicion of unexplained pyrexia—at the merest shiver. And when coliform or staphylococcal septicæmia has been confirmed, antibiotic treatment is a further continuous process to be checked constantly by blood-cultures and corrected according to the resistances revealed. Meanwhile, owing partly to liver damage, partly to circulating anticoagulants from repeated blood-transfusions, the coagulating mechanism breaks down; fibrinogen is reduced and thromboplastin production is at a standstill because of liver failure. The patient begins to bleed from the wound, from the alimentary tract, and elsewhere. Now the prothrombin-time and coagulation-time must be monitored, not to mention the hæmoglobin, and repair controlled with blood, intravenous vitamin K, and thromboplastin. Meanwhile relative leucopenia necessitates review of the antibiotics that are being administered, lest one should be having an adverse effect on the leucocytes.

This is an outline of episodes in an actual case; but such events, though perhaps especially common in ulcerative colitis, are not confined to cases of that disease. If therapy is to be rational it must be controlled by repeated tests—a continuous process. With each passing year this is likely to become more evident as therapeutic methods become more complex. In some subjects there is already complexity enough. For instance, the oxygenator pump, which does not itself achieve a therapeutic end, can be maintained in action only by repeated or continuous determinations of blood pH and oxygen saturation, and of aortic and caval pressures, and by electroencephalographic and electrocardiographic recordings. Obviously treatment in the modern milieu cannot be applied effectively on the organisation of yore; for there is an immediacy of interpretation and of therapeutic action which calls for the continuous presence of an experienced doctor.

There is an aspect of hospital treatment which after twenty years remains almost unchanged—convalescence. Nobody seems to be able, or prepared, to answer the question: When shall a patient return to work? Perhaps this is because the convalescent is in a therapeutic no-man's-land. Anyhow the prevailing uncertainty has remarkable results, as has been shown by Moss et al.[1] These workers sent a questionary to four different medical groups—professors of surgery, "board-certified" surgeons, industrial physicians, and general practitioners—to discover what period of convalescence they recommended after such common operations as appendicectomy, hæmorrhoidectomy, herniorrhaphy, and cholecystectomy. The periods varied considerably within each group; after inguinal herniorrhaphy anything from 7 to 84 days was recommended before return to light work, and 20 to 180 days before heavy work was undertaken. The professors and surgeons apparently considered that their patients should return to heavy work earlier than the industrial and general practitioners thought desirable. Can this mean that those who see convalescent patients most, either at work or in the home, observe that full strength does not return as rapidly as those who operate may expect? Surely this subject, which is of the highest importance to the individual and the community, should be investigated objectively. Many factors governing convalescence are assessable: for example, a normal incision should be quite firm by the end of three weeks; and it is possible to compute the expected blood-loss for each of the common operations and thus predict how soon the hæmoglobin level will be fully restored, provided the level before operation is normal. By taking into account the severity and effects of the initial illness, the nature and severity of treatment, the complications of treatment, and (perhaps most important though least easily defined) the inclinations, personality, and morale of the patient, it should be possible to work out the approximate length of convalescence. This is not to suggest that the "sentence" thus determined should be served to the day. But it would help both doctor and patient to have a more reliable estimate than one based on prejudice or whim.

Gallstones and the Surgeon

"IT is the Micawbers of surgery who kill gall-stone patients": OGILVIE thus epitomised prevailing surgical opinion.[2] It is true that many stones remain symptomless until death; and others give rise to such rare and brief attacks that they constitute no more than a minor annoyance; but, whereas twenty years ago the

1. Moss, N. H., Schwegman, C. W., Dohan, F. C. *J. Amer. med. Ass.* 1957, **165**, 322.
2. Ogilvie, Sir H. *J. R. Coll. Surg. Edinb.* 1956, **2**, 49.

operation carried far from negligible risks, today patients die not because of the cholecystectomy but because cholecystectomy has been postponed :

> " Each attack of cholecystitis brings hepatic damage in its train and leaves the patient more unfit. Each attack makes the operation more difficult and the risk of complications more likely. Each year allowed to slip by means another step on the road to the cemetery. Apart from the slow march of the years, the progressive disintegration of liver function and the steady formation of adhesions and distortion of anatomical landmarks, there are certain complications—empyema and rupture of the gall-bladder, septic cholangitis, acute pancreatitis, gall-stone ileus, and cancer of the gall-bladder—all of them usually fatal—that may come with or before the next attack if the next attack is awaited rather than anticipated." [2]

But if there is general agreement that gallstones should be removed at the earliest favourable opportunity, surgeons still differ in their definition of the qualifying " earliest favourable ". Nobody now advocates immediate emergency operation for acute cholecystitis as a routine ; and few would delay longer than three or four months. Those in favour of early intervention (a minority in this country) perform cholecystectomy as a " semi-elective " procedure within seven days of emergency admission ; they maintain that little can be gained and much lost by waiting longer. Championing this form of management, ELLISON [3] reaffirms that an attack of acute cholecystitis is nearly always initiated by a calculus obstructing the outlet of the gallbladder. From the obstructed viscus water and salt are absorbed ; and there is a corresponding increase in the concentration of bile-pigments, calcium carbonate, and cholesterol. " The local irritation produced by this concentrated chemical solution leads to a greatly thickened œdematous wall ; and the gall-bladder, behaving not unlike a dialysing membrane filled with a hypertonic solution, becomes distended." [3] (It can be shown that the intravesical pressure is roughly proportional to the duration of the obstruction.) ELLISON estimates that œdema and distension lead to vascular impairment, localised gangrene, and perforation in no less than 25% of patients ; general peritonitis follows in few of these, but localised abscesses and fistulæ may have dire late consequences. It may seem that the unhappy course in this 25% of cases hardly justifies early operation on all ; but ELLISON and like-minded surgeons feel that even in the 75% in whom the attack would subside spontaneously, operation is easiest " when the œdema which is present in the acute process, produces an avascular cleavage plane between the sero-muscular layers of the gall-bladder and facilitates its enucleation. . . . Further delay will only lead to scarring and make subsequent operation difficult, in addition to predisposing patients to further attacks during the waiting period ".[3] Even without attacks this can be an anxious time, which few patients later care to remember. One might add that the most practised surgical eye will miss, now and again, a case which requires early or immediate surgery.

Most advocates of delayed operation would assert that 25% is too pessimistic a figure ; but the rest of the argument for early cholecystectomy is simple and convincing. Once the decision to operate is made, it is both economically and psychologically sound to carry it out as soon as possible ; and the burden of proof rests on those who favour delay. It is shouldered by their spokesmen with verve and eloquence. OGILVIE [4] sums up conservative (or, rather, delayed surgical) management as a policy of " hoping for the best while planning for the worst " ; it is a course which modern antibiotic and intravenous therapy has placed on a firm scientific basis.

> " The great majority of cases settle down with conservative treatment, and those that do not, give abundant warning. . . . If the fever and the mass are tending to decrease, the attack should be allowed to subside, and cholecystectomy should be performed after an interval sufficient to allow the inflammatory œdema to be absorbed, usually one of at least three weeks."

Only if the symptoms and signs progress should an emergency operation be performed ; and the primary object then is to save life. In the worst cases OGILVIE advises simple drainage and evacuation of stones, especially the " key-stone " impacted at the gall-bladder neck—a salutary reminder to aspirant perfectionists who throw up their hands in horror at the mere mention of cholecystostomy. OGILVIE readily concedes that in the acute phase " the gall-bladder can be shelled out easily from its œdematous bed ; but the identification of the duct junctions and the accurate ligation of the cystic duct and artery can be a matter of great difficulty. . . . Most of the disasters of gall-bladder surgery are due to emergency operations undertaken unnecessarily rather than to delay." [4] This is the crucial (and to many surgeons the overwhelming) argument against early operation ; but others may be added. The inflammatory œdema which allows the gallbladder to be " shelled out " may progress, within a matter of hours, to a phase of intense congestion ; and a more treacherous field for dissection it would be hard to imagine. Moreover, a large proportion of patients admitted with acute cholecystitis—more than half in a series reported from New York [5]—have associated diseases which need careful assessment. Even the biliary system incorporates anatomically distinct though functionally related organs. [6 7] " The liver, and pancreas, with their ductal systems ; the duodenal mucosa which produces secretory hormones ; and finally the pylorus and gastric mucosa make up a functional unit. . . . The gall-bladder is merely a passive pouch in the bile-duct which may function primarily either to deliver concentrated bile into the duodenum or to regulate pressure in a closed system." [8] Routine early operation may be convenient and satisfactory in most cases, and in the hands of a few masters it may be uniformly successful ; but a form of management which does not allow detailed preoperative evaluation of the whole system, and which, at operation, tends to constrict the surgeon's mental and physical image to one part only, is bound to cause misgivings.

As in the matter of timing, OGILVIE urges caution over another controversial aspect of gallbladder surgery.[4] " To any young surgeon I would say ' Leave the common duct alone.' " To arguments against routine or semi-routine choledochotomy [7] OGILVIE adds the weight of special experience, gained in two

3. Ellison, E. H. *in* Current Surgical Management. Philadelphia, 1957.

4. Ogilvie, Sir H. *Ann. R. Coll. Surg. Engl.* 1957, **21**, 319.
5. Doubilet, H., Reed, G., Mulholland, J. H. *J. Amer. med. Ass.* 1954, **155**, 1570.
6. *Lancet*, 1956, ii, 184.
7. *ibid.* 1957, Sept. 21, p. 580.
8. Mulholland, J. H. *in* Current Surgical Management. Philadelphia, 1957.

hospitals " to which the disasters of surgery are sent from all over the world ". If the common duct contains stones, it must be opened and the stones must be removed : " but it must not be opened out of curiosity, or because the author of ' What's What in Surgery ' says so. A duct whose diameter does not exceed 7 mm., whose colour is light gray, whose contents as sampled by needle exploration are clear yellow and free from débris and mucus, one that feels smooth from end to end when felt between finger and thumb, does not contain stones large enough to require removal. . . . I am anxious to discourage wanton exploration of the common bile-duct, because of the many sequelæ of such interferences." Like the American workers on whose findings we commented,[7] OGILVIE reports that symptoms indicating partial or recurring obstruction of the common bileduct usually follow exploration of the duct.

Meddlesome surgery still accounts for many indifferent, bad, or disastrous results in the treatment of gallstones. By careful timing, and relying on surgical judgment rather than on technical brilliance, it should be possible to deal with most cases by a single operation : however dazzling the performance, the biliary system is no place for surgical encores.

Whither Whitley ?

THE Minister of Health's rejection of a Whitley Council recommendation for a 3% pay increase for administrative and clerical staffs in the health service has caused many who were uninterested in such matters to ask themselves for the first time What is the Whitley system ? It is convenient, if fortuitous, that they can readily find the information they want in a useful examination [9] of the structure and implications of the system, as applied to the health service, which was published earlier this year. Too many doctors, perhaps, have given insufficient weight to the fact that " we are all in this together ". If Whitleyism is misconceived, or if its joints creak, its faults may affect the nurse equally with the porter, and the hospital doctor equally with the clerk.

Mr. CLEGG and Professor CHESTER set out to answer two questions : Can the Whitley system of the health service be improved ? and Does such a centralised system of determining salaries and wages shed any light on the possibilities of a national wage policy ? They start in traditional fashion with the history of the system as applied to the health services. The first trade-union of hospital workers was founded in 1910 and the first strike took place in 1919 (not surprisingly, in mental hospitals). The late war, with its Emergency Medical Service, first involved the Government in the problems of hospital salaries, and in those early empirical days the representatives of the medical profession " showed themselves to be competent and, tough negotiators ". The pre-1948 structure grew naturally into the present Whitley system, in which traces of its influence remain in the undue proportion of local-authority representatives on the management side of the councils.

The course of salary negotiations in the health service since 1948 makes a long and interesting if disappointing story. The only salaried group whose pay has kept pace with rises in the outside world are the nurses—though, if hours of work are taken into account, they are still among the lowest-paid of professional workers. The grade which has had the smallest increase is that of full-time consultant.

What determines the success or failure of a claim for more pay ? Shortage of labour is one factor, as shown by the relative success of claims by nurses. The rise in the cost of living is another. But in the health service these have not been so important as " relativities " ; for many health-service claims have gone to arbitration, and the usual reaction of any arbitrating body must be How does this claim compare with the rates in similar fields ? In the absence of a national wage policy, this in itself tends to produce a spiral effect, which is one more reason for a national policy. But, however desirable such a policy may be, it is unpopular with employers and employees alike, and no practical means of " muzzling " private industry has ever been propounded. Hence it seems unlikely to be realised in the near future. This being so, is the less formidable task of establishing a wage policy in one nationalised " industry "—the health service—a possibility ? Admittedly it would not be easy, but if the Government wish to run the health service successfully they cannot much longer leave matters to a mixture of arbitration and chance.

The ineffectiveness of the Whitley machinery in dealing with the salaries of hospital doctors is shown by the fact that negotiations have repeatedly been conducted directly between the profession and the Minister of Health. Its ineffectiveness in dealing with the salaries of the ancillary professions has been deplored in our columns by loyal but frustrated physiotherapists, radiographers, laboratory technicians, pharmacists, and almoners, who are all struggling against shortage of staff. Its ineffectiveness in dealing with the salaries of the nurses—at least in the mental hospitals—is shown by the present unhappy ban on overtime in various parts of the country. Yet the importance of all these members of the medical team cannot be denied. Young people must be attracted to these professions by good pay, good conditions, and good prospects, rationally related to prospects open to them elsewhere. Unless this fact is faced, and a start is made, this country will soon be open to the charge that it is not really enabling the national resources to be used for a national health service.

The Whitley machinery is not only inadequate : it is also too rigid. By its tenets a national rate is a national rate, and must not be varied locally. Yet it is well known that the London teaching hospitals have waiting-lists for nurses, whereas in the provinces these are much harder to recruit. Ought not some incentives to be offered in unpopular places ? Such a principle is admitted in general practice, where the Whitley writ does not run ; but there is almost nothing comparable in the hospital service which will allow a hospital which is geographically or otherwise handicapped to attract the staff it needs. No doubt, as the Guillebaud Committee said, the loss of the local autonomy formerly enjoyed by hospitals in this matter is " an inescapable result of the introduction of a National Health Service " ; and perhaps it was right in arguing that " the provision for flexibility

9. Clegg, H. A., Chester, T. E. Wage Policy and the Health Service. Oxford : Blackwell. 1957. Pp. 142. 18s. 6d.

should be built into the national agreements themselves and not left to the discretion of individual managing bodies who might be tempted to compete between themselves . . . for the limited manpower available in the country ". But the committee's really important point was that the example of other large undertakings should be followed and that ways should be sought for introducing more flexibility " to meet local variations ". For our part we have long held that hospital authorities, like other employers, should also be able to reward outstanding service. The defects of the existing points system for the remuneration of administrators have been made sufficiently clear by Sir NOEL HALL'S report. [10]

Annotations

SOCIAL SERVICES AND THE FAMILY

THE purpose of the Welfare State, according to Lord Beveridge in his foreword to Mr. Cyril Smith's book of sociological essays,[11] is not that " everything that the citizen could desire " should be provided but rather that a minimum be " guaranteed by the State, without a means test, so that every man can safely spend or save for himself for all that he or his family might desire to have beyond that minimum ". It is concerned, therefore, not with providing luxuries but with preventing " primary " poverty. But it is not easy to distinguish between genuine basic need and socially conditioned desire, for the concept of need is constantly changing and is very closely related to changing economic conditions. Moreover, psychological and social influences exert a powerful influence on our general idea of a reasonable minimum standard of life ; and it becomes harder, as the general standard of living rises, to decide what is a luxury and what is a necessity. Tobacco and alcohol were once regarded as extravagances, but many people nowadays would claim that they are necessities. The National Assistance Board allowances do provide for a limited amount of money to be spent on amusement and recreation over and above that calculated for food, rent, heat, light, and clothing. This more liberal interpretation of human need has given rise to some misunderstanding and to the complaint that today " society is held together by the social services ". It is comforting to find, therefore, that Mr. Smith's researches in Dulwich lead him to say that " By and large the family and the neighbourhood group look after their own problems ", with the social services of the Welfare State merely filling the cracks caused by the severer kinds of strain and stress. If this were not so, he points out, we should need a greatly increased and much more costly array of services. For this reason, if for no other, we should seek to ensure the independence and to increase the effectiveness of the family as the primary social group.

The family has indeed (like all worth-while and vital institutions) changed its rôle in the face of changing conditions. Often critics who bewail what they call the collapse of family life are merely underlining this fact, and, by lamenting what has been lost or altered, they ignore what has survived and what is novel. Personal relationship, as an end in itself, and companionship in leisure hours have come increasingly into prominence. The social services have probably gone about as far as is wise towards removing burdens from parents' shoulders, and the position is likely to be stabilised at least for a generation or so. There is no denying the paramountcy of the family in emotional development and personality maturation. Mother and father love will remain of unique importance in the proper upbringing of children, and it is impossible to conceive of any public institution which could supplant the family in this most vital of all its responsibilities. Whoever looks after the child's teeth or teaches him the three R's, only the parents can give him the security born of intimate, loving contact.

The function of the social services is to aid all families ; but obviously some families have more problems than others, and fewer resources with which to deal with them. This is not simply a matter of money : there is also morale, the family's mental and nervous resilience, which is largely attributable to hereditary endowment ; further, the age and sex composition of the family are important in determining its ability to solve a problem ; and so, too, is numerical strength, for the larger the family group the more hands and pockets available in time of emergency. Today, even though most needs have been met, particular hardship can still be experienced by a few unlucky people such as old-age pensioners, widows with young children, or wives of chronic invalids. In a time of rapidly rising costs, these exceptional households often find the gap between means and needs widening. It is important that monetary allowances and other services should be readily and easily adjustable for these handicapped families, and that their misfortune should not be lost sight of amid the general rise in living standards.

Mr. Smith's book is based on only a hundred and thirty households selected at random from the poorer half of the east ward of the electoral district of Dulwich ; and the interviews were mostly with housewives. Although it cannot be claimed that this subsection of a London borough is representative of the whole country, or even of most working-class areas, the study is important as one of the first attempts to examine poverty in contemporary society, and because it shows the need for a much more generously supported research plan. The question of how the family is faring under present-day conditions merits much further research.

CONDITIONED-REFLEX SLEEP

LONG-CONTINUED narcosis still has a place among the physical methods of psychiatric treatment. There are disadvantages in the kind of course that used to be given in which the patient was submitted to 10–14 days of sleep interrupted briefly for meals, toilet, and a bare minimum of exercise. Even when the course is much modified the amount of sedative and hypnotic drugs required to produce long periods of full sleep may have unwanted side-effects. New techniques are being tried in psychiatric clinics in the U.S.S.R.

A year or two ago Kerbikov [1] described the induction of electro-sleep by means of a rhythmic current of 0·2–0·3 millisecond pulse-duration, frequency 1–20 c.p.s., and current strength 5–15 mA, applied between electrodes on the frontal and occipital regions. This did not always produce sleep, but it usually produced sedation. Kerbikov claimed good results in mild depressive states. He also described the use of intravenous alcohol, claiming that this was helpful in schizophrenics—especially those showing " protective inhibition " (perhaps what we would call negativistic and catatonic states). Beilin [2] has now described a conditioned-reflex technique for giving sleep treatment. The technique makes use of all the usual common-sense environmental aids to sleep ; then in addition neutral stimuli—olfactory, visual, auditory, and thermal of a soothing and not unpleasant type—are conditioned to the effect of some sedative such as sodium barbitone. Beilin reports that in one case up to 16 hours' sleep a day was obtained over a period of 9 days with

10. See *Lancet*, Nov. 30, 1957, p. 1104.
11. Smith, C. S. People in Need, and other essays. By C. S. SMITH. London : Allen & Unwin. Pp. 155. 21*s*.

1. Kerbikov, O. V. *Lancet*, 1955, i, 744.
2. Beilin, P. E. *S.C.R. Soviet med. Bull.* 1957, **4**, 1.

altogether only 0·9 g. of sodium barbitone. A similar conditioned effect presumably operates in the effective use of sterile water injected in place of narcotics; but if real pain is present the conditioned effect rapidly ceases—in Pavlovian terms by lack of reinforcement and internal inhibition. The technique described by Beilin seems to overcome this difficulty. It is clearly worth further exploration in both hypnotic and analgesic therapy, if only because of the relatively small amount of drugs required.

ON NOT WEIGHING THE BABY

VARIOUS procedures concerned with the care of the young baby have been modified or discarded in recent years, with consequent saving in time and energy for midwives, nurses, doctors—and mothers. Some of these did not satisfy scientific scrutiny; some had become unnecessary in view of discoveries in therapeutics or prophylaxis. Thus routine prophylactic eyedrops are now infrequently used; the cord is tied or clipped and left to dry and drop off without the use of a dressing or binder; strict feeding by the clock is modified to suit what the baby appears to want; and circumcision has been assailed as seldom necessary on medical grounds. The most recent iconoclastic campaign is concerned with whether babies attending infant-welfare centres should be weighed as a regular and routine part of the work.

Dr. Esther Simpson,[1] from the Province of Natal Centre of the Institute of Child Health of the University of London, attempted to reduce very considerably the amount of weighing at "a non-weighing session" and learnt a great deal in the process. Whereas new mothers coming to such a session would accept infrequent weighing, the older clients, used to weighing, at this or other centres, experienced "a great shock" at the idea of attaching less importance to weighing. It appeared that the result of the weekly weighing was broadcast widely in in the family circle, and fathers expected to receive this regular news item. It became clear that for some mothers the weight-card was the only factual and concrete evidence of baby's progress. If deprived of this, the mother would sometimes, despite assurances that the baby was contented and thriving, go to the nearby chemist's shop to have the weighing done. Thus there were over-anxious mothers for whom baby-weighing seemed to be essential. But there were also nursing mothers with incredibly placid babies who were dangerously underfed, and weighing was useful to check carelessness or to encourage the happy-go-lucky type to attend the centre regularly.

As the experiment proceeded mothers at the centre apparently changed their standards. The time saved by not weighing every baby at every attendance gave more time for individual and group teaching by the health visitors. Mothers could be taught to observe small changes in wellbeing, happiness, energy, and temper of the baby and to accept these as part of the wide variations in normal progress. In an indirect way the mothers are being led to accept greater responsibility for their offspring, and with their eyes turned away from a weight-chart their eagerness to fuss and stuff is abating. Dr. Simpson suggests that a monthly weighing is probably about right to satisfy the type of mother who indulges in what she terms "progressive overfeeding".

Generally speaking, apart from the addition of immunisation procedures, the infant-welfare centre today preserves the pattern of fifty years ago. Something like a time-and-motion study seems overdue, not only for economy in woman-power, but to transform the atmosphere of the centre from that of a milk depot to one of concern with general child care, including psychological care.

1. Simpson, E. E. *Med. Offr*, 1957, **98**, 305.

THE ARTIFICIAL KIDNEY

EXPERIENCE of ninety dialyses by means of a disposable, twin-coil, artificial kidney [1] has been described by Aoyama and Kolff.[2] The 52 uræmic patients in this study included 29 cases of acute oliguric renal failure, of whom 15 recovered fully; and 11 of these were judged unlikely to have recovered if only standard conservative therapy had been applied. 1 patient, proved at necropsy to have irreversible renal damage, died after eight separate dialyses during sixty-three days of virtually complete anuria, less than one litre of urine having been passed throughout this time. In all cases dialysis resulted in unequivocal biochemical improvement, and relief of uræmic twitching, stupor, and vomiting. There were few serious complications from the treatment. Some temporary hypotension was recorded in 50% of cases and mild increase of blood-pressure in 44%. Slight fever occurred in sixteen dialyses, and auricular fibrillation or flutter in three. Hæmorrhagic complications secondary to administration of heparin were uncommon and mild even in patients who had recently had major surgical operations.

Carter et al.[3] have reported their experience with this method of treatment in acute renal failure in children. Of 5 patients, 4 recovered completely. In dialysis in children of less than 20 kg. body-weight only one of the twin coils of the apparatus was used. Hæmorrhagic manifestations of uræmia were improved after dialysis, but were occasionally made slightly more severe while the patients were being dialysed and treated with heparin. Scalettar et al.[4] describe 2 patients with acute renal failure complicated by massive gastrointestinal hæmorrhage—from peptic ulcer in one case and from hiatus hernia in the other. These patients' lives were undoubtedly saved by repeated hæmodialysis. Under such circumstances a calculated risk is involved in treatment with the artificial kidney; but this may offer the only hope of recovery. In a study of uræmic bleeding, Rath et al.[5] found that, of 45 patients, 55% had thrombocytopenia with a platelet-count of less than 150,000 per c.mm., 82% had abnormal prothrombin consumption, 51% had prolonged one-stage prothrombin-time, and 33% had prolonged plasma-recalcification time. None of the patients had a reduced plasma-fibrinogen level. Dialysis was carried out in half of these patients, and in no case was there any exacerbation of the hæmorrhagic tendency, although thrombocytopenia was often temporarily increased. Patients with acute renal failure due to acute glomerular nephritis were found to show the most severe hæmorrhagic symptoms.

Similar favourable results from hæmodialysis are now being reported in this country.[6] Most workers with personal experience of the artificial kidney in the treatment of acute renal failure would now agree with Aoyama and Kolff[2]: "The artificial kidney no longer is a last resort and measure of desperation; it has taken its place in the routine treatment of renal insufficiency."

1. Kolff, W. J., Watschinger, B. *J. Lab. clin. Med.* 1956, **47**, 969. See *Lancet*, 1956, ii, 1297.
2. Aoyama, S., Kolff, W. J. *Amer. J. Med.* 1957, **23**, 565.
3. Carter, F. H., Jr., Aoyama, S., Mercer, R. D., Kolff, W. J. *J. Pediat.* 1957, **51**, 125.
4. Scalettar, R., Rubini, M. E., Meroney, W. H. *New Engl. J. Med.* 1957, **257**, 211.
5. Rath, C. E., Mailliard, J. A., Schreiner, G. E. *ibid.* p. 808.
6. McCracken, B. H., Parsons, F. M. *Quart. J. Med.* 1957, **26**, 584.

Mr. ISAAC WOLFSON is to give £125,000 to the Postgraduate Medical School of London for a building which will contain lecture rooms and common rooms.

Dr. MAURICE MITMAN, medical superintendent of Joyce Green Hospital, Dartford, Kent, died on Dec. 13.

Dr. L. EVERARD NAPIER, formerly director of the Calcutta School of Tropical Medicine, died on Dec. 15.

Points of View

WHERE DOES MEDICINE FIT IN?

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M.B. Sydney
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WE ought, I think, to look at our profession critically from time to time and reassess its role; for the world we work in is always changing. When changes are gradual they may not be noticed; and so it happens all too often that we, like our history-books, are quite a few years and ideas behind the times.

An appraisal of this kind is made more difficult by the specialisation so characteristic of our day. Not only is medicine itself fragmented, but it is separated from other phases of human life and endeavour. As techniques advance, the possibility of outside criticism recedes: the specialist is insulated as well as isolated. The risk for us is that, lacking external criticism, we may lose our own critical faculty as well—a fate to which we are already predisposed by the specialisation within the profession itself.

Provided the doctor maintains and broadens throughout his life his study of man, in its widest form, he has nothing to fear from specialisation. But against the pressure of everyday work, and the weakening, with age, of the capacity to learn and retain, he fights a slowly losing battle.

The Weaknesses of Medicine

Medicine cannot be practised as a hobby, but demands undivided attention. Therein lies, I think, one of its fundamental weaknesses, for no man can devote all his time and energy to one pursuit without suffering from deprivation of other pursuits or activities. To be a good doctor one has to be more than a doctor, but one has time only to be a doctor.

What other weaknesses are inherent in medicine? Perhaps the main fault in our calling is its emphasis on the abnormal. All doctors are pathologists, looking for deviations: what falls within the limits of normality lacks interest or at best is taken for granted. We do not say "normal", we say "nothing abnormal detected". Now, admittedly, if there were no sin, there would probably be no virtue either; but is it reasonable to dwell on sin? Just as virtue is more than lack of sin, health is more than absence of disease; yet as doctors we concentrate on removing or preventing disease only. I contend that this preoccupation with disease or abnormality must warp our outlook. Not only does the practice of medicine not confer any immunity, but continual contact with physical or mental imbalance must have some harmful effect on our own body and personality. This effect will vary in different people; it may be an increased susceptibility to psychosomatic disturbances or simply a dulling of aesthetic values. If we accept disease as an integral part of our day, we must tolerate physical and mental ugliness.

Moving away from the shortcomings of medicine as they affect the doctor, let us examine those which affect the patient. Here again specialisation must be mentioned; while the patient's heart or brain or gallbladder may benefit from specialisation, the patient as a whole is the loser. When a lesion is detected, his medical advisers' attitude may be that, if the lesion is cured or removed, then the harmony of the body will restore itself. Once a diagnosis has been made, the patient as a whole may be deliberately pushed into the background in the hope that the line of treatment chosen will obviate the need to probe more deeply into a multifactorial ætiology. Then there is the weakness introduced by the patient's limitations in understanding and cooperation. It is relatively easy to treat a patient to whom the illness can be explained and who can be brought to help himself; but when he cannot or will not understand his complaint, and the way it affects him, medicine becomes immeasurably more difficult.

Again, there is the unpredictability of the individual case. Whilst the dissimilarity of any two cases of the same condition makes for interest to the doctor, the variability of prognosis is a handicap to the patient, since it usually results in a guarded forecast which allows for the worst outcome and may cause needless restrictions and worry.

Scope and Limitations of Medicine

This brings us to the question of what a doctor can do and what he cannot do.

We are continually being reminded of the advances and progress of medicine, and unquestionably many things are possible today which were impossible one or two generations ago. But, without detracting from these diagnostic and therapeutic achievements, I think it fair to point out that the real progress is much less than is claimed. We have managed to change the pattern of disease: that is all. As in everything else, solving one problem leads to the appearance of new ones, often more difficult or intractable than the first, and in some directions at least we seem to be approaching problems that cannot be solved. Proportionately, more doctors are kept busy today than fifty or a hundred years ago; but taken as a whole, there seems to be no evidence that there is less disease. Where once a man's first illness might well be his last, today he can clear many such obstacles before reaching his grave.

The technological advances of medicine have introduced two main problems—first, those brought about by the lengthening of man's life-span, and secondly the group of iatrogenic diseases. To these must be added the diseases of stress which are also a by-product of this age.

Apart from such social implications of longevity as higher tax upon the young to support the old, we are seeing a new picture of chronic and degenerative diseases in our hospital and infirm population. In dealing with the biological deterioration which comes with increasing years, medicine cannot be curative or restorative, but at best palliative and delaying. This is probably less satisfying for the practitioner; but if he applies the standards and yardsticks of youth to the subject of time-induced deterioration, then everybody will be disappointed.

As time goes on, iatrogenic disease too is becoming more important. It includes both such obvious manifestations as sensitisation reactions, drug fevers, chronic drug intoxication (e.g., from barbiturates and tranquillisers), and complications due to treatment with powerful drugs (often more serious than the original condition), and also more subtle ill health in the form of mental insecurity and fears induced by medical propaganda designed to bring illness to light at the first appearance of symptoms. To mention only two examples, cancerophobia and the dread of coronary disease, based on irrational feelings or "symptoms", are on the increase.

Increasing also are the stress diseases which, if our interpretation is correct, are the result of technological development too rapid for the slower mental and moral development of mankind. In considering them we need a biological perspective.

In this age of mechanical and electrical appliances, we are putting too much faith, I think, in copies or models of biological systems. No artificial kidney would ever do the job as well as the real kidney; no heart-lung preparation will ever supersede the natural article. Surgeons are particularly prone to forget or ignore the lesson of

normal physiology: they are so much impressed by their increasing ability to remove safely larger and larger chunks of our anatomy that they do not often enough stop to consider that the price of heroic surgery is usually a much diminished human being, with many functions interfered with. It is not to *their* credit that Nature can sometimes compensate for extensive mutilations including a good deal of normal tissue. So, too, with cases that have a hopeless prognosis from the start—where the only factor in doubt is the time of survival—it is hard to condone extensive procedures which cause much discomfort and risk. Such procedures do not constitute progress at all; but there are signs that they may be a last fling for the surgeons, whose field, already encroached on by the medical control of inflammation, may be greatly reduced by non-surgical approaches to the treatment of malignant disease.

The Doctor's Role

We come then to the crucial questions—what is a doctor and what is his role? We assume that he is a repository of knowledge not available to the general population, and is endowed with some innate skill, enhanced by training and practice. Compared with his neighbour, he is not necessarily better integrated with his environment, though he has a better opportunity of watching the effects of failure of such integration. If he is honest with himself he will freely admit that in a large proportion of cases he cannot or need not attempt to alter the natural history of disease in his patients: many will recover, irrespective of treatment, and some will die whatever he does. These two groups then mainly need advice, reassurance, or comfort—in the mixture appropriate to them. A minority will require the application of that particular skill which distinguishes the doctor from the successful charlatan. The remainder consists of those who have no disease but fear it, or seek refuge in physical symptoms from mental unrest, dissatisfaction, or imbalance. These neurotics are a manifestation of a civilisation in which we have lost the pillars of solidity and tradition, the stabilising influences of days gone by.

Today we glorify the machine and the ephemeral. We have had Copernicus and Darwin and Freud; we have thrown religion overboard; the family, and the community group of the village or small town, are losing their force and disintegrating. Even allegiance to the State has become depersonalised: patriotism is either dead or equated with dangerous nationalism. No wonder then that we have our neuroses and anxiety states. Is it fair, though, to expect the medical profession to shoulder the burden of aching humanity? We cannot, on the face of it, offer any solution to the instability and insecurity of the world. Or can we?

Let us consider a little more closely the trends in people's attitude to disease and doctors, and the related question of the doctor's status or prestige. In primitive people disease is not a medical matter: it is due to extraneous influences, brought to bear on a person by his misdemeanours or by unfavourably disposed spirits. Our Australian aborigines—I mean those still imbued with their own lore—will not come to see a doctor of their own will, and can seldom be persuaded to see one unless they feel they have got to the stage where they have nothing more to lose. Except for their tendency to run away, they make wonderful patients: they make no demands on their doctor, and feel no more dependent on him than a young child does. In a sophisticated community, on the other hand, the average patient has a few notions of disease and its causes (though often very distorted). He has lost most of the faith-hooks that his grandfather relied on; he has fallen prey to the all-pervading principle of indeterminacy which seems to be the keynote of the present time; and he is thus inclined to become dependent on such a guiding light as his doctor. This dependence is all very well while he is suffering from an illness determined by exogenous factors which can be controlled quickly: he is cured quickly and his demands on the doctor are met. But if he cannot be cured quickly, and particularly if there are endogenous factors in his illness which need equanimity on his part or the resolution of conflicts (well removed from medicine), his faith in the doctor may fade; he may transfer the cause of slow improvement from himself to the doctor and may even enter into litigation with him. Sometimes he will change from one doctor to another, seeking healing, but refusing to accept the fact that this must come from within himself. Meanwhile his attitude to his disease becomes more and more fixed until the disease becomes quite incurable. He is then a confirmed neurotic or hypochondriac.

A Solution

In brief, what I have said so far is that changing conditions require changes of outlook in medicine and its practitioners; that we have no reason for complacency about ourselves or about medical progress; and that the ever-increasing insecurity and instability of our world brings us, as doctors, face to face with people cracking and creaking under the strain. To this situation specialisation provides no answer, for it is the practical negation of spreading interests and universal understanding. The true answer, on the contrary, is bound up with a wider meaning of medicine, as part of biology, and of biology as part of a general cosmology. It is only by putting man in his right place—by viewing him in perspective—that we shall realise just how small and insignificant his troubles are. The difficulty is to convince ourselves of our presumptuousness: we have somehow to learn that we are not the centre of the Universe, that we are not different from other forms of life, and that we have not even full conscious control of our minds. Perhaps it is just because of our mental limitations that we are so tenaciously presumptuous. We take ourselves very seriously indeed, because we judge ourselves by our limited standards.

Yet, what is our record? We have existed for only a very short time in a very small part of the Universe. Though we happen to be the leading current form of life on our planet we are neither the biggest nor the most long-lived, and there is nothing except our pride to suggest that we are the ultimate in Evolution. If, from our point of view, the worst happens and our race is extinguished, I can imagine some little amœba smiling and saying to itself "Oh well, I'll just have to start all over again."

I wish all doctors had some knowledge of geology and astronomy. Far removed from medicine? Why, yes, that's just the point. It is exactly what is necessary to give us that time-space perspective we are so much in need of.

Conclusion

The difficulties facing medicine are similar to those facing mankind as a whole. A medical education, and the vista it affords, suggests that we shall face them best if we look at man, his trials and his hopes, against the background of organic and inorganic evolution. In doing our work diligently and hopefully let us from time to time raise our eyes and thoughts to the larger scene in which we play our little part.

"Let us resolve to bury for ever the divorce, almost the schizophrenia, which divides our present society (or at least our present society of 'eggheads') into two hostile and mutually uncomprehending camps . . . the truth is that neither is complete without the other. No humanist is complete without an intimate understanding of the characteristics, the working and the potentialities of the techniques of our current scientific civilization. And I would say that no scientist was capable of giving his best unless he used the added perception he has acquired from his scientific studies to form a part of a cultured and humanized approach to life."—Viscount HAILSHAM, *Nature, Lond.* 1957, **180**, 1311.

Special Articles

CHEST X-RAY EXAMINATIONS AND RADIATION HAZARDS

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THE great increase in the diagnostic use of X-rays in this country has been particularly evident in chest radiography. Thus in the past four years Harrow Chest Clinic has taken chest films of the following numbers of people :

	Persons examined	*Units of work*
1953	18,691	29,609
1954	18,897	39,285
1955	19,593	43,800
1956	19,706	41,156

The number of units of work is approximately equal to the number of exposures of the patient, since tomography, barium swallows, sinus examinations, &c., form a small part of the total work done by the radiological department.

Court Brown and Doll (Medical Research Council 1956) have put forward the working hypothesis that the incidence of leukæmia, after all but the highest doses of radiation, is directly proportional to the dose received by the bone-marrow, and that this simple proportional relationship holds even for the lowest dose of radiation ; but the amount of radiation received from one chest X-ray examination is probably of an order that could be ignored. On the other hand, between 17 and 18 million X-ray examinations are carried out annually in England and Wales, of which about 12% involve the chest, and this could have an effect on the rate of gene mutation. Thus the Medical Research Council (1956) point out that " there is no known threshold for the induction of gene mutations by radiation : that is to say, any additional exposure, no matter how small, must be expected to raise the mutation rate, if only by a minute amount."

In chest radiography about 0·38r is given to adults and 0·19r to children, and Stanford and Vance (1955) have shown that the dose of radiation received by the gonads is 0·36mr for the male, and 0·07mr for the female and the fœtus. This was in one hospital " where particular care is taken to reduce the gonad dose to the minimum," and Clarke (1957) has shown that this dose is probably exceeded in most departments. Since the total dose to the gonads from natural sources of radiation is about 0·15r per annum, the frequency of chest examinations in young people becomes important.

A great part of the diagnostic work of the Harrow Chest Clinic is done by means of " X-ray only " sessions, which are held daily (Trenchard and Grenville-Mathers 1952, Grenville-Mathers and Sheldon 1956) and do not necessitate the making of any prior appointment by the patient's general practitioner. Two views are taken of each adult and one view of each child, using an 'Odelca' camera producing an image measuring 70×70 mm. In addition all pregnant women attending the antenatal clinics of either the associated hospital, Edgware General, or the local authority, are referred for chest radiography during their pregnancy. During the four-year period June 1, 1953, to May 31, 1957, all patients attending these sessions have been asked when they last had an X-ray examination of their chests. Altogether 21,685 people, comprising 8765 men, 9355 women, and 3565 antenatal patients have been examined in these sessions during the four-year period. (540 men and 756 women, and 89 from antenatal clinics, were referred more than once, and their second and, occasionally, third attendances have been excluded). The first attendances have been analysed according to age and sex and to the period since the previous chest radiograph. The following categories have been distinguished :

A : previous chest film within a year.
B : " " " between one and three years previously.
C : " " " more than three years previously.
D : no previous chest film.

The total numbers in each age-group and the percentages falling into each category are given in table I.

Especially in the younger age-groups of this population of examinees, chest X-ray examinations have been frequent. Thus, in children under 5 years, 4·5% of boys and 9·3% of girls had had a previous chest radiograph within a year. The dose received by children is especially important since a comparatively small dose is responsible for the induction of tumours in children in contrast to the large doses needed in adults (Medical Research Council 1956) and, in considering genetic effects, we are

TABLE I—NO. OF PERSONS EXAMINED AND PERCENTAGE DISTRIBUTION ACCORDING TO PERIOD SINCE PREVIOUS CHEST X-RAY

—	Age	No. of cases	Previous chest X-ray (%)			
			Within 1 year	1–3 years previously	More than 3 years previously	Never
Males	0–4	337	4·5	1·5	0·6	93·4
	5–9	817	8·9	8·6	6·6	75·9
	10–14	563	11·7	8·0	16·2	64·1
	15–24	1240	22·9	18·6	26·1	32·4
	25–44	2595	20·5	20·1	32·7	26·7
	45–64	2633	16·8	16·2	33·1	33·9
	65 and over	580	15·7	12·4	28·4	43·5
	Total	8765	17·1	15·6	26·9	40·4
Females	0–4	279	9·3	2·5	0·7	87·5
	5–9	736	10·7	8·6	7·5	73·2
	10–14	486	11·5	8·4	13·2	66·9
	15–24	2027	22·6	20·0	25·1	32·3
	25–44	3360	16·1	19·8	35·1	29·0
	45–64	2099	13·4	13·6	32·6	40·4
	65 and over	368	10·3	9·0	28·0	52·7
	Total	9355	15·8	16·0	27·8	40·4
Antenatal cases	15–24	1233*	30·2	19·8	22·4	27·6
	25–44	2332†	20·4	20·7	29·7	29·2
	Total	3565	23·8	20·4	27·1	28·7

* Includes 1 aged 14. † Includes 2 over age 45.

TABLE II—PERCENTAGE IN EACH CATEGORY OF PREVIOUS CHEST X-RAY EXPERIENCE RECALLED FOR FURTHER RADIOGRAPHY

—	Age	Percentage recalled among those with previous chest radiograph			
		Within 1 year	1–3 years previously	More than 3 years previously	Never
Males	0–4	67	40	0	18
	5–9	41	29	33	28
	10–14	59	16	20	20
	15–24	24	15	16	13
	25–44	25	19	25	16
	45–64	42	44	42	38
	65 and over	48	51	62	49
	Total	34	28	33	26
Females	0–4	19	29	100	25
	5–9	27	29	27	28
	10–14	7	27	25	16
	15–24	17	15	15	10
	25–44	26	20	20	12
	45–64	34	24	27	25
	65 and over	24	61	33	40
	Total	21	21	22	20
Antenatal cases	15–24	4	6	2	1
	25–44	2	3	3	1
	Total	3	4	3	1

concerned only with doses to the gonads received up to, and during, the reproductive period of life.

Among young adults aged 15–24, only a third had not had a previous chest radiograph, and nearly a quarter had been X-rayed within the previous year.

The radiation received by these patients (of the order of 0·75r for adults and 0·2r for children) is the minimum, for a number of these people had films which showed abnormalities requiring their recall for clinical examination and further radiography. Thus during this period about 20 cases of pulmonary tuberculosis were found per 1000 persons examined, and of men and women aged 45 years or over, 40 per 1000 and 7 per 1000 respectively were found to have a bronchial carcinoma. Table II gives the proportion of patients recalled in each category, expressed as a percentage of those attending. For example, among young adult examinees in the 15–24 age-group, with a record of chest radiography in the previous year, 24% of males and 17% of females were recalled.

Summary and Conclusions

Although the amount of radiation received during radiological examination of the chest is small and probably does not carry any danger to the individual, there may be genetic risks. Analysis of the frequency of chest X-ray examinations in 21,685 people attending the "X-ray only" sessions of the chest clinic during a four-year period indicates that the younger members of this population are being radiographed relatively frequently. This population consists of patients referred by general practitioners, but a large proportion of the references are routine precautions, and this population is not therefore highly selective of people with histories of chest disease. It is indeed quite likely that the frequencies of previous radiography shown in table I are typical of a large section of the general population. The risk involved in these examinations has to be weighed against the possible advantage or even necessity of the examination to the patient. The risk can, however, be reduced by keeping the re-examination of such patients to a minimum and by strictly limiting the X-ray beam to those parts of the body which have to be exposed.

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Public Health

SALMONELLA INFECTIONS IN RODENTS IN MANCHESTER

WITH SPECIAL REFERENCE TO SALMONELLA ENTERITIDIS VAR. DANYSZ

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ALTHOUGH the *danysz* variety of *Salmonella enteritidis* is a less common cause of human illness than the *jena* variety, it gives rise to a number of sporadic cases each year and to an occasional large outbreak. Taylor (1956) recorded 414 human infections, with 2 deaths, that had occurred in the country between January, 1944, and June, 1955. Only 4 of the 2149 salmonella infections of man that came to the notice of the Public Health Laboratory, Manchester, in the seven years 1949–55 were due to *danysz*, but our interest in them was stimulated by the fact that on 2 occasions there was evidence that infection had been derived from living cultures used as rodenticides.

Human Infection in the Manchester Area

1. In 1951, during the investigation of contacts of two cases of *Salm. typhi-murium* infection in a family, one other person was found to be excreting *Shigella sonnei* and a fourth *Salm. enteritidis* var. *danysz*. This last person was a man, aged 57, who worked as a sorter of scrap-metal in a clean modern aircraft factory, and had no apparent connection with rodents. He had had no recent gastrointestinal symptoms, and subsequently remained well: the source of his infection was not discovered.

2. In June, 1953, two adults, a male engineering worker, aged 31, and a housewife, aged 38, became ill with diarrhœa, pyrexia, and abdominal pain within 48 hours of each other: *Salm. enteritidis* var. *danysz* was isolated from the fæces of both. Their homes and places of work were over 4 miles apart.

When questioned in hospital, the man said that his diet was exactly the same as that of his family, all of whom had remained well, except that he usually bought cakes to eat with the sandwiches he brought from home for his midday meal. He identified the two shops from which he had bought cakes on the 2 days before he became ill, and remembered that on one of these days he had had two vanilla slices. The two shops obtained their supplies of confectionery from four different bakeries. The woman patient was questioned about the consumption of cakes, and remembered buying and eating two vanilla slices from a local shop on the day before she became ill. It was then found that the manufacturer of these vanilla slices also supplied one of the two shops from which the man had bought cakes. At the bakery, mouse droppings were found in the work-rooms: traps were set, and 3 adult and 6 baby mice were caught. At necropsy there were no naked-eye abnormalities, but *Salm. enteritidis* var. *danysz* was isolated from the spleen though not from the bowel contents of one adult mouse. It was learnt that the premises were being treated for mice and cockroaches, and that a number of baits consisting of bread soaked in a culture of *danysz* had been laid about a month before. Fæcal specimens of most of the bakery workers were examined and were negative for salmonellæ.

3. In March, 1954, a man aged 70 had an acute attack of diarrhœa and vomiting, and *Salm. enteritidis* var. *danysz* was isolated from his fæces. About 10 hours before the onset of his illness he had had a midday meal, consisting of a corned-beef sandwich, a custard tart, and an iced bun at a snack bar. The manager of the bar asserted that the sandwiches were made freshly each day and that the confectionery had come from a bakery on the same morning. Traps were set in the snack bar and an adult mouse was caught. It was found to have areas of necrosis in the spleen and an abscess in the suprapubic region: *Salm. enteritidis* var. *danysz* was isolated from the liver, spleen, kidney, bowel contents, and pus from the abscess. No evidence of mice was found at the bakery. It was ascertained that baits containing *danysz* had been used recently in a passage adjoining the snack bar.

Salmonellæ in Rats in Manchester

When *Salm. enteritidis* var. *danysz* is isolated from mice caught on premises where food has been contaminated with the same organism, the significance of the finding depends on the carrier-rate among "normal" wild mice. One of the arguments sometimes used to justify the use of *danysz* as a rodenticide is that it is a

TABLE I—PROPORTIONS OF INFECTED HOUSE MICE, BROWN RATS, AND BLACK RATS

—	House mouse			Brown rat			Black rat	
	No. examined	No. positive	Salmonella found	No. examined	No. positive	Salmonella found	No. examined	No. positive
City	256	1 (0·4%)	*enteritidis* var. *danysz*	405	14 (3·5%)	*enteritidis* var. *danysz* 5 *typhi-murium* 4 *enteritidis* var. *jena* 2 *dublin* 1 *meleagridis* 1 *florida* 1	3	0
Port—								
Dock premises	35	0	..	95	8 (8·4%)	*enteritidis* var. *danysz* 7 *anatum* 1	77	0
Ships ..	73	2 (2·7%)	*typhi-murium* *stanley*	0	..	..	199	0
Total ..	364	3 (0·8%)		500	22 (4·4%)		279	0

natural pathogen of rodents. We decided, therefore, to investigate the presence of salmonellæ in mice from places unconnected with outbreaks of food-borne infection. The opportunity was also taken to examine for salmonellæ other species of rodents caught in the city and port of Manchester, including both the dock premises and the ships. The investigation was continued from April, 1954, to March, 1956. The specimens from the city came mainly from the northern and central parts, because it was not always easy to arrange for the rest to be brought quickly to the laboratory. Those from the port consisted of the whole of the smaller catches and representative samples of the larger catches.

Method of Investigation

The spleen and the cæcum were removed with aseptic precautions. Half of the spleen was placed in 10 ml. of nutrient broth, incubated at 37°C, and subcultured to Wilson and Blair's medium and to deoxycholate-citrate agar at 18 hours and at 7 days. The cæcum was opened and placed with its contents in 10 ml. of single-strength selenite F broth, which was subcultured to the same solid media after 18 hours at 37°C. Salmonellæ were isolated and identified by orthodox methods.

Results

Salmonellæ were obtained from 25 of 1143 rodents: they included *Salm. enteritidis* var. *danysz* (13), *Salm. typhi-murium* (5), *Salm. enteritidis* var. *jena* (2), and *Salm. anatum*, *dublin*, *florida*, *meleagridis*, and *stanley* (1 each). 9 of the isolations were from the spleen only, 6 were from the cæcum only, and 10 were from both spleen and cæcum. In only 4 of the 13 animals infected with *danysz* was the gut culture negative. 2 of the isolations from the spleen were made after subculture at 7 days but not after 18 hours.

Table I shows that there were considerable differences in the proportion infected between house mice (0·8%), brown rats (4·4%), and black rats (0).

Only 1 out of 256 house mice from the city yielded a salmonella, and since this was a strain of *danysz* the circumstances were investigated further.

The mouse had been caught in an old dwelling-house forming part of a terrace, and there was no evidence that a bacterial rodenticide had been used there. However, the next building but one in the row was a small bakery, the proprietor of which said that he had a contract for pest extermination. Inspection of the premises revealed a small square of dry bread with a smear of brown material on one surface. The baker identified this as a bait laid by the exterminator, but could not remember how long it had been in the bakery. *Salm. enteritidis* var. *danysz* was isolated from the bait, but no further mice were caught in the bakery.

2 strains of salmonellæ, 1 each of *typhi-murium* and *stanley*, were obtained from 73 house mice caught on ships in the port. One ship had recently arrived from Lagos and the other from Bombay.

The 22 salmonellæ isolated from brown rats included 13 strains of *Salm. enteritidis* var. *danysz*. Table II shows the distribution of positives among rats caught in different sorts of premises in the city. In addition to the 7 strains of *danysz* from the docks (4 of which were obtained within a period of a month), 2 were from rats caught on the same rubbish dump on one day, and 3 were from separate homes. This distribution suggested that localised foci of infection may have existed in the rat population. None of the rats from which either the *danysz* or the *jena* variety of *Salm. enteritidis* were isolated had been caught on premises where a bacterial rodenticide had been used. The number of rats from butchers' shops and abattoirs was rather small, but 4 out of 20 were infected (*Salm. typhi-murium* 2, *dublin* 1, *florida* 1). The only other strains of *typhi-murium* obtained from rats were 2 from the same dwelling-house. *Salm. meleagridis* was isolated from a rat caught under a chicken-house.

The absence of salmonellæ from 279 black rats, from ships, from the dock area, and from neighbouring premises, was unexpected.

TABLE II—DISTRIBUTION OF INFECTED HOUSE MICE AND BROWN RATS

—	House mouse			Brown rat		
	No. examined	No. positive	Salmonella found	No. examined	No. positive	Salmonella found
Dwelling-houses	88	1	*enteritidis* var. *danysz*	220	3	*enteritidis* var. *danysz*
					2	*typhi-murium*
					1	*enteritidis* var. *jena*
Institutions (hospitals, schools, restaurants, clubs, and public houses)	47		..	33		
Factories and business premises (not food)	77		..	93	1	*enteritidis* var. *jena*
Food premises—connected with meat	5		..	20	2	*typhi-murium*
					1	*dublin*
					1	*florida*
Food premises—other	39		..	9		
Gardens, rubbish-dumps, &c.	0		..	30	2	*enteritidis* var. *danysz*
					1	*meleagridis*

Discussion

Salm. enteritidis var. *danysz* was isolated from 2·4% of brown rats, and its presence could not be attributed to the recent use of a bacterial rodenticide. It seems likely, therefore, that this organism is a natural pathogen of the brown rat in Manchester, as in other parts of the country (Ludlam 1954). On the other hand, of 256 house mice caught in the city, only 1 (0·4%) was infected, and in this case it seemed likely that the organism had been acquired from a bait laid in a nearby bakery. There is no evidence that infection with *Salm. enteritidis* var. *danysz* exists among the local mice, except where it has been introduced artificially by man.

When a mouse infected with *danysz* is found on premises in which food is thought to have become infected with the organism, it is reasonable to assume that a bacterial rodenticide has been used. In both of the incidents of food-borne infection seen in Manchester such a mouse was found, and baits were known to have been laid by commercial pest exterminators during the previous 2 months.

The Working Party on Precautionary Measures Against Toxic Chemicals in Industry (1953) expressed the opinion that, because of the possible risks to public health, it is desirable to avoid the use of bacterial rodenticides. So long as baits are in use, the working party held that they should not be permitted in kitchens or other premises in which food is prepared or sold. This precaution might reduce the risk associated with the use of bacterial rodenticides, but our experience suggests that it would not eliminate it. Although the movements of mice are restricted, many food premises are in buildings or rows of buildings part of which are used for other purposes. We think there has now been enough time for a " change-over to other methods not involving the same risks " (Working Party 1953), and that legislation should be introduced to prohibit the use of bacterial rodenticides as the Working Party recommended.

Summary

Two instances of food-borne infection with *Salm. enteritidis* var. *danysz* are reported. In both there was evidence that mice had acquired the infection from living cultures in baits and had later infected the food.

A survey of salmonellæ in the spleen and gut of rodents in the city and port of Manchester showed that 4·4% of brown rats were infected, 2·4% of them with *Salm. enteritidis* var. *danysz*. There was no evidence that these infections were derived from bacterial rodenticides.

The only salmonella isolated from 256 Manchester house mice was a strain of *Salm. enteritidis* var. *danysz*, and there was evidence that it had been acquired from a bacterial rodenticide used in a nearby bakery.

We are grateful to Dr. Joan Taylor for advice, and for confirming the identity of a number of salmonella cultures.

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Influenza in the Liverpool Region

In a report on the effects of the influenza epidemic in the Liverpool region, Dr. T. Lloyd Hughes, senior administrative medical officer of the regional hospital board, says that the epidemic suddenly became evident on Sept. 16, when many family doctors found their work trebled. By Oct. 7, 1 nurse in 5 in the region's hospitals was ill with influenza (the figure was 2 in 5 at Whiston Hospital). Admissions were restricted to emergencies, voluntary nursing bodies helped, additional beds at Fazakerley Isolation Hospital were brought into use, and Newsham Hospital became an acute hospital for patients of all ages. The death-rate for patients with influenzal pneumonia was fairly constant throughout the epidemic, averaging 13·4%.

Colourings and Flavourings in Food

The nutrition panel of the food group of the Society of Chemical Industry met on Oct. 23 to discuss colourings and flavourings in food.

Dr. B. R. J. THOMAS said that there is no point in defending the use of colours—their use has long been accepted, and is therefore permitted in foodstuffs. From the viewpoint of both the colour manufacturer and the user, it is important that colours be acceptable to the public. Cost is not important as extremely small quantities are used. The manufacturer must know, however, that the list of accepted colours is likely to be stable and not likely to be altered often. The colouring matters on the permitted list must be pure—i.e., they must not have any dangerous contaminants—and they must be non-toxic and, in particular, non-carcinogenic. From the viewpoint of the food manufacturer colouring matters must, in addition to being safe, be stable to heat, change in pH, and oxidation and reduction, and should form stable mixtures.

Legislation which is now in force is based upon the findings of the Food Standards Committee, which examined the colours used in the food industry and divided them into three categories

A.—Colours that seem unlikely to be harmful (amaranth and ponceaux SX).

B.—Colours for which the available evidence is conflicting (green S and black PN).

C.—Colours presumably harmful (nigrosine and methyl-violet).

The list of permitted colours includes both A and B colours, and it is not possible to obtain completely satisfactory greens, browns, or blacks from purely A colours. A difficulty is that colours are not universally acceptable; evidence accepted in one country does not necessarily pertain in another.

Mr. G. R. A. SHORT said that flavourings are non-nutritive: their function is to make food more attractive, although the essential oils are said to be an aid to digestion.

Both natural and synthetic flavours have advantages for particular purposes, and the nature of the substance to be flavoured must be considered. For example, if a jelly were to be flavoured entirely with a natural fruit-juice concentrate, so much would have to be added that a sticky mass would result, while the synthetic flavourings are so pure and powerful that comparatively little need be used. The manufacturer often has to add an excess of flavouring in order to compensate for the losses in processing.

Natural flavourings are very difficult to reproduce synthetically. Most of the essences on the market are in fact blends of natural and synthetic flavourings. Public demand is often for a product which has a taste unlike the natural one (e.g., amyl acetate as a flavouring for pear-drops).

Prof. R. T. WILLIAMS discussed the biochemical and pharmacological aspects of both groups of additives. The realisation that toxic or carcinogenic properties may be found in many substances suggested as food additives has stimulated much investigation. Information is needed on the following points before a substance is accepted as a food additive: (1) acute or chronic toxicity, including carcinogenesis; (2) absorption from the gut; (3) nature and toxicity of metabolites; (4) elimination; and (5) accumulation in the body.

Most of the colourings used in foods are either sulphonic acids or azo compounds. The sulphonic acids are strong acids that are not readily absorbed from the gut but, if absorbed, are readily excreted.

Some azo dyes are themselves carcinogenic or have carcinogenic metabolites (e.g., some are converted in the liver to 2-naphthylamine and then 2-amino-1-naphthol, which is a known carcinogen). Examples of safe azo and sulphonic acid dyes are tartrazine, sunset yellow F.C.F., and amaranth.

Most of the substances used in flavours can be readily handled by the body. Esters are split to alcohols and

acids, which are then oxidised or conjugated. Aldehydes are readily oxidised (e.g., cinnamic → benzoic acid). A toxic effect of citral, which is reversed by vitamin A or SH compounds, has yet to be confirmed. The toxic dose of most of these compounds is large, and they are used in only small amounts. The lactone coumarin is relatively toxic.

Medical Education

CHRISTMAS QUIZ

BY

FFRANGCON ROBERTS

1. What famous doctor

(*a*) invented a biscuit ; (*b*) invented milk chocolate ; (*c*) made a notable contribution to archæology ; (*d*) was murdered in his bath ; (*e*) wrote an opera at the request of an Empress ; (*f*) introduced the mangold-wurzel to England ; (*g*) was better known as a botanist ; (*h*) was the first in England to receive a hereditary title ?

2. (i) What English ruler

(*a*) was said to have been poisoned by a monk ; (*b*) suffered from an ulcerated leg ; (*c*) was said to have died of a surfeit of lampreys ; (*d*) died of smallpox ; (*e*) was said to have swelled up after death causing the coffin to burst with a loud crack ?

(ii) What English ruler's embalmed head is private property ?

3. (i) Name, in order, the Ministers of Health since 1938. (ii) Has the appointment ever been held by the same person more than once ?

4. What are the medical associations of

(*a*) *La Bohème* ; (*b*) *The Decameron* ; (*c*) "My mother bids me bind my hair" ; (*d*) Tarantella ; (*e*) *La Traviata* (*La dame aux camélias*) ?

5. What have the following in common :

(*a*) tularæmia, Derbyshire neck ; (*b*) Somerset Maugham, Boyd Neel, Robert Bridges ; (*c*) John Fothergill, J. C. Lettsom, Joseph Lister ; (*d*) Hippocrates (according to tradition), Florence Nightingale, Sir Charles Sherrington ?

6. Distinguish between

(*a*) Sylvius, J., and Sylvius, F. ; (*b*) Jenner, E., and Jenner, W. ; (*c*) Tormina and Taormina ?

7. (i) What disease was known as

(*a*) The Captain of All the Men of Death ; (*b*) muslin disease ; (*c*) polka morbus ; (*d*) the English disease ; (*e*) Stop, Knave, and Know thy Master ?

(ii) What disease is named after a character in a poem ?

8. Whose patients were

(*a*) Joseph Meister ; (*b*) Pythian of Thasus ; (*c*) Alexander Pope ; (*d*) Marcus Aurelius Antoninus ; (*e*) Sir Isaac Newton (in his latter days) ; (*f*) King George II ; (*g*) James Phipps ?

9. What is, or was, meant by

(*a*) galenical ; (*b*) botch ; (*c*) roin ; (*d*) alexipharmia ; (*e*) Jesuits' bark ; (*f*) hydromel ; (*g*) tisic ; (*h*) oxymel ; (*i*) bezoar stone ?

10. Who said or wrote

(*a*) I have no faith in medicine but I have great faith in Corvisart ; (*b*) You doctors are as bad as the lawyers ; (*c*) Nous avons changé tout cela, et nous faisons maintenant la Médecine d'une méthode toute nouvelle ; (*d*) All professions are conspiracies against the laity ; (*e*) A doctor is a person who pours drugs of which he knows little into a body of which he knows less ; (*f*) Her Highness's distemper was nothing but the vapours.

11. Complete the following, naming the author :

(*a*) Better to hunt in fields for health unbought——

(*b*) God and the doctor we alike adore
But only when in danger not before ;
The danger o'er, both are alike requited——

(*c*) What time the poet hath hymned
The writhing maid, lithe-limbed,
Quivering on amaranthine asphodel,
How can he paint her woes,
Knowing, as well he knows——

(*For answers see p.* 1294)

In England Now

A Running Commentary by Peripatetic Correspondents

On Christmas night all Christians are supposed to sing, but I for one tend to regard the coming festivities with a jaundiced eye. You see they knock all my good resolutions and worthy efforts of the last eleven months for six. It's not only the women that are on slimming diets. No, Sir. I too have a little clock mapped out in calories that I move round with every helping according to its dimensions and nutrition. I know a fat lot (why did I say fat ?) about roughage and carbohydrates and scan all the latest articles on fat-balance like a stockbroker reading the closing prices : I veer in my gastronomic inclinations like a weather vane with every gust of scientific information. It's not my figure I'm bothered about, of course, that never was much nor ever will be : it's atheroma.

It does tend to disrupt the household a bit; the fuss and bother seems to have taken more weight off my wife than it ever seems likely to do off me. Take that time when we regarded margarine as a noxious overhydrogenated substance and the local butter industry went into boom : that changed, of course, a few *Lancets* ago and the local farmer can't understand it, but it'll probably swing back in a few months' time. Thank God I haven't passed the latest scientific contributions on to my patients in a systematic way, they'd think I was real daft. Then there was the fish-oil craze : two whole weeks I had sardines from the tin twice daily after meals : that stopped when my wife insisted that I sleep downstairs. We stopped eating eggs just at the time when they were down to 2½*d.* each and my wife struck for a rise in housekeeping.

There have been results though, you can't deny it, only last month my weight dropped from 14 stone 7 to 14 stone 5 and that says something for something. So that's why I resent Christmas coming and mucking me about : how can you live on nuts and lettuce with everyone else tucking into roast turkey ? Did they have thrombosis in the days when Good King Wenceslas Looked Out ? No : Christmas this year will be just like any other day ; toast sliced thinly with unsweetened tea and a little grated carrot . . . oh all right if you insist, thank you, just a little more pudding. With my usual Christmas load of peripheral vasodilator they should at least sclerose open.

* * *

While the messenger waited breathlessly, I read the request, "Send at once to the operating-theatre two units of freshly drawn ACD blood." I debated with myself, does this mean group A, type Rh_1 blood, or blood freshly drawn into acid-citrate-dextrose solution ? In view of the emergency, I decided to send group O, Rh-negative blood, which I duly marked with its blood type, Odd. A few minutes later the telephone rang. "What's wrong with this blood ?" "It looks all right to us." I replied, "There is nothing wrong with the blood." "Then why have you marked 'Odd' blood all over the place ?"

* * *

An atypical surgical friend of ours is by nature a placid, easy-going type, addicted to peace and quiet—we have sometimes wondered if his thyroid might be mildly inadequate. Not for him the red mist in front of the eyes, the broken golfclub, the bitten carpet. All the time we have known him he has never thrown a scalpel at the theatre sister except under extreme provocation. Our friend has recently relinquished clinical life in favour of the sequestered calm of the University, and when we met him the other day we expected to find him more than usually urbane. But not so ; his eyes were shifty and his fingers twitched.

It appears that one day last week a chap arrived with a pneumatic drill to tear up some concrete flooring next door to our friend's lab. No-one had thought to warn him of the impending cataclysm, and the initial burst of the drill caused him to rise three feet in the air, completely severing the terminal portion of his tongue. By the time he grounded again, some distance from take-off, the entire lab was vibrating, and for the rest of the

morning important telephone messages were blasted out of existence, consecutive thought was rendered impossible, and our friend was thrown about in his chair like a pea in a bottle. At 2.10 P.M. the man went home, and our friend's eardrums twanged in heartfelt relief.

At 2.15 P.M. precisely a gigantic sanding machine began to operate in the passage outside. Our friend tells us that the vibration dislodged two fillings in his teeth and sent several thermostats demented. In vain did he attempt to reason with the operator, who had his orders and insisted on carrying them out. However, after two hours the epicentre gradually receded into the distance; our friend took a refreshing draught of amylobarbitone and settled down to work.

Seven and a quarter minutes later a brightly coloured truck dashed round the corner and came to rest under the window. Two large men leaped out and began to fiddle with a complex engine mounted on the back; immediately a thunderous rubbing noise burst forth from the bowels of the machine. Our friend's room began to move to and fro; reprints fell like ticker-tape from the shelves, pictures swayed and rattled, and the desk edged itself across the floor towards the window. Our friend staggered out to inquire from the Secretary what was going on. "It *is* a nasty noise, isn't it?" screamed the Secretary brightly, in a wild British understatement; "I do wish the botany department would sterilise their flowerpots somewhere else!"

Every man has his breaking-point. Our friend reached for the telephone with a trembling hand and dialled the Professor of Botany. After a brief sketch of his views on the history and technique of flowerpot sterilisation he adumbrated his opinion of the character, morals, and antecedents of the operators and of the motives which prompted them to undertake flowerpot sterilisation outside his window rather than outside the botany department.

The next day all was peace, but in the heat of his one great moment he omitted to remember that the Professor of Botany is also the acting Vice-Chancellor. Our friend is now waiting, an apprehensive and broken man, to be stripped of his academic buttons.

* * *

Now that household duties have become another of man's prerogatives, shopping habits have changed. These expeditions are now accomplished in the minimum of time with the minimum of effort. Vast supermarkets have sprung up along the highways to attract the business man on his way home from work. Parking accommodation is generous, and he all but drives himself to the door, which opens for him photoelectrically. He then trundles a stainless steel trolley along avenues lined by shelves holding anything from a toothbrush to a turkey to the accompaniment of soft and psychological music. As an inducement to purchases, some stores proffer so many stamps per dollar spent to be stuck into a bonus book. When the book is full—in about 4 years by my calculation—the collector gets a radio set. Many stores have a comprehensive traffic system, but the customer invariably ends at a desk where his goods are packed while a machine rapidly computes their cost. Finally comes the most irksome part of all—the bag may have to be carried anything up to 50 yards to the car, but some enterprising stores have installed a conveyor-belt system. Then the busy man needs only to drive himself to a sort of filling-station in the parking area where the week's, and sometimes even the month's, shopping is deposited in his boot.

* * *

PHUTILEXICON

As in the Forces long ago,
We stripped men down (and women too)
And gave them labels so it seemed
—we did and had and were PULHEEMED:
So now, in every civil station
We're subject to PULHESTIBATION,
Or maybe (there is the suggestion)
We shall put up with LUPHIBESTION:
But *pace* Holt, let's stifle those
Who wish to classify our toes
With neologic verbal blebs
—phantasmagoric PHUTILEBS!

Letters to the Editor

A FUNCTIONAL NECESSITY

SIR,—Having served as a representative on the Central Consultants and Specialists' Committee from its inception until just over a year ago, and having been a member of its subcommittee on junior hospital staffing (Strachan), it is to me disappointing to find an absence of any positive move to implement the recommendations of the Strachan report in some form, or to produce a solution of the problem of the senior registrar.

I do not suggest that the recommendations are the only answer, nor that they should be followed literally; but surely the time has come for the Joint Committee to show some evidence of coming to life in seeking some implementation of the report, in spirit if not in letter.

Only very recently I was a member of an appointment committee for the selection of a surgeon to the staff of a large non-teaching hospital and there were fifty-two applicants. All but a few had passed their fourth year as senior registrar, and several were in their ninth and tenth years. The age of the youngest was 34 and of the oldest 45. Most had been unsuccessful on previous occasions—one of them, an excellent candidate, no less than fifteen times. The situation is heart-breaking for those who have to go on trying like this. It is not enough to say that competition is healthy—it may be so, but not to this extent. Neither is it right to say that it was always difficult in former times—it was never as difficult as it is today.

The point has even now been reached where the time-expired senior registrar is being "placed" in another hospital in the same region—there have been at least two recent examples of this in my own region. If the position had been satisfactory there should have been two senior-registrar vacancies for the upgrading of registrars. Instead, two young men, of no less promise, have been held back on the promotion ladder. This is certain to have its repercussions, and I believe that it is happening already. Two recent registrar vacancies attracted twelve very good candidates, but none was from this country. The warning light has been seen.

It seems to me that in resisting the establishment of any other grade in the hospital service[1] the Central Consultants and Specialists' Committee may have been misdirected. Until they are willing to consider something of the sort, or to put forward some acceptable alternative, they are in no position to advise the Joint Committee. Is this the reason for the stalemate?

Dr. Rowland Hill stated (Aug. 10) that the younger consultant should do much of the work that, since 1948, has been relegated to registrars. He added that this would be to his good, and to the patient's good, and that he should no longer think of himself as entitled to the same conditions of work as the older men in the service. He suggested that regional hospital boards should copy immediately the example of the teaching hospitals and introduce the "firm" system as extensively as possible. The adoption of such a scheme would, I believe, be a real advance but not a complete solution.

One of the major mistakes in the health service was in making every consultant equal in status and pay. I have seen no convincing evidence to suggest that the Ministry would seize upon the idea of assistants as "a cheap labour force." Once upon a time we were afraid that the tendency in hospital appointments would run towards the setting up of a full-time service, but this has not happened. The two fears are not dissimilar. With proper safeguards it should not be beyond the wit of the Joint Committee to see to it that the plan is made to work.

There is a general feeling amongst the thinking members

1. See Sellors, T. H., Strachan, G. I. *Lancet*, July 13, 1957, p. 92.

of the profession that there is some lack of the spirit of adventure in the leadership. In your own words (Nov. 30) "fresh thinking is needed." It is needed urgently; for, if something is not done, the structure of the hospital service will break down.

To underline much of what you yourself have said, I would like to put forward a plea that something like the following should be considered as a basis for discussion:

(1) Assistant physicians, assistant surgeons, &c., should be appointed when and where a place can be found for them.

(2) They should be appointed as members of a "team"—to work under the supervision of senior consultants.

(3) They should consult in the same outpatient clinic, be allowed a number of "courtesy" beds, and be responsible under the chief for the care of emergency admissions.

(4) The appointment might be full-time in the first instance and be subject to review in three to five years. It should be a career grade and carry a reasonable chance of promotion to the senior staff when a vacancy occurs.

(5) Remuneration should be related to the responsibility, should be at a rate lather less than that of the senior grade, and should of course, carry pension rights.

Something very like this operated satisfactorily before the National Health Service. Such posts were called "assistant physician", "assistant surgeon", &c., and there was no difficulty. I can see no need to describe them differently now. If he wished to succeed, the occupant of such a post had to be patient and to cultivate a capacity for taking pains. Such qualities are still needed in the National Health Service. In addition, the post would carry some security, which the senior registrar does not at present possess.

Leicester. E. R. FRIZELLE.

SIR,—Your leading article of Nov. 30 and the letters in last week's issue make it clear that the profession is in a muddle.

Yet the problem is simple. Either a doctor is qualified or not qualified to be a consultant in his specialty. If he is fit he must face the risk of the rough-and-tumble of open election—election first to assistant surgeon or physician which makes him a consultant, and then open election to the post of full consultant physician or surgeon. The promotion from assistant to full physician or surgeon would not be automatic; but the assistants would be the only eligible candidates in open competition.

The only decision that then remains for the administrators to make is: How many consultants are required?

London, W.1. G. E. LOXTON.

EARLY ADMISSION TO HOSPITAL OF MENTALLY DEFECTIVE BABIES

SIR,—Miss Adams calls for home treatment of mentally defective babies. In gross impairment of the nervous system (either congenitally, as in microcephalus and hydrocephalus, or by birth trauma, as in anoxia) one may feel that proper care at home is impossible for these infants. Happily we all know several families (and not always the richest and best housed) where everyone feels his responsibility and they manage to attend these babies well. In the medium-grade defectives (e.g., mongols) the physician attending the birth usually has to suppress his own disappointment and keep the diagnosis to himself to spare the mother. There will be time enough to tell her later about peculiarities in behaviour, aspect, and conduct. Where the father is young and emotional it is better to spare him too and to inform the grandmother. It is better not to withhold an opinion; otherwise reproaches may later be made about medical ignorance or carelessness. It has been my habit to emphasise all the attractive traits, the happiness and love of music, and to talk about possibilities of educating the child. We mitigate our sentence by speaking of "differences in development", "a special kind of child needing much love and patience and afterwards a special kind of school".

I do not send a mongol into hospital unless other congenital deformity compels it. I advise parents to have another baby after the birth of a mongol if the parents and the next of kin lack the *petits signes mongoliens* and if the mother is not over 40. Older children usually accept the mongol at home, even the very youngest. A very backward child, with habits dangerous to himself or other people, or conducting himself indecently, will require a place in an institution or temporarily in a hospital. In some families even a single backward child leads to such tensions between the parents that admission to an institution is justified.

For every backward child I insist on home care if possible, to develop everyone's responsibility and to give the handicapped one the same opportunity for affection as his brothers and sisters.

Hilversum, Holland. D. P. R. KEIZER.

TRAINING MEDICAL STUDENTS IN PSYCHOTHERAPY

SIR,—Your account (Nov. 30) of the B.M.S.A. symposium on Sexual Instruction for Medical Students makes particularly interesting reading, coming as it does one week after Dr. Balint's address on the teaching of psychotherapy to medical students.

Somehow the fulfilment of the two needs seems to be interwoven. A tutorial approach to the first might lead to a reshuffling of groups for easier handling of the second more difficult task. A tutor appointed to undertake this work would need to be attached to a teaching hospital so that senior students might work with patients under supervision. More junior clinical students might join in case-conferences, even though not themselves listening to patients.

It may seem an impertinence for someone not concerned with the teaching of students to make suggestions of this kind. To those who feel that this is so I should like to say that this gap, in an otherwise magnificent vocational training, is so real and so demoralising in the work of so many practitioners once they leave their teaching hospitals that the plea must be made.

Most teachers of medicine do now recognise that psychotherapists have a body of available information ready to hand on to serious students of the general practice of medicine.

How many newly qualified practitioners have longed to be equipped to begin to cope with all sorts of psychogenic problems: the man suffering from nausea when he meets his girl-friend; the girl not venturing from home because of (minimal) acne; the person reduced to a state of confused depression; the boy who is making no friends with girls or boys; the young man with persistent functional dysuria; and a host of other troubles?

It seems likely that most students who can cope with their other medical subjects would be able to master enough psychotherapy to enable them to face such patients without embarrassment and with reasonable confidence of their ability to undertake or to advise treatment as in other branches of medicine.

Dr. Balint has made plain many of the problems of imparting psychotherapeutic knowledge, including the difficulty of adding yet another "course" to the over-stuffed curriculum. With these studies it is important that whatever time is allotted should be spread over the whole of the years of training to allow for growth and maturation of the student. It would seem proper to begin classes in behaviour, including sexual behaviour, at the same time as anatomy and physiology studies begin, and after this for students to join perpetual teams in hospital, the most senior ones leaving as the most junior arrive.

My experience with students' problems suggests that there would be less danger of breakdown among them than among established practitioners seeking such training after years of trying to manage without it. I envisage that work of this kind would avert at least as much ill health as it would provoke. Although the emotional strain of learning psychotherapy would be great for some people, it might at the same time lead to a lightening of the fog of misunderstandings and preconceptions which, in the same people, interferes in the struggle to reach conclusions in their everyday lives.

Some medical students suffer sorely from concealed emotional distress which is largely due to ignorance and which they dare not reveal for fear of being classed as poor students or, worse still, as potentially poor doctors. This is by no means always true, but where it is really so early discovery of the situation would be an advantage.

This is precisely the right age at which to begin instruction in psychotherapy. The person is vastly ignorant, and at the same time thirsting for insight. He is more adaptable than he will ever be again and is still young enough to resist the more shattering effects of remorse, which so often afflict older people struggling to expand the access to their own and their patients' understandings.

Students' Health Service,
University of Bristol. AGNES H. WILKINSON.

TRANSFUSION OF CITRATED BLOOD

SIR,—As your leading article of Dec. 7 mentions packed red cells as an alternative to citrated whole blood, the following may not be irrelevant.

The plasma/citrate/red-cell proportion of an ordinary pint (540 ml.) of citrated British blood has the remarkable percentage figures of 44 : 22 : 33. Because the red cells swell approximately 20% in the acid-citrate-dextrose solution (A.C.D.) the hæmatocrit of 40% will revert after transfusion to its true value of approximately 33%.

In the replacement transfusion of the newborn infant suffering from hæmolytic disease, "concentrated red-cell suspension" with a true hæmatocrit of 50–55% (60–66% in A.C.D.) is usually used. This suspension is simply prepared by removing 240–250 ml. of the supernatant citrate plasma; 70% of the citrate is incidentally got rid of. Provided a closed method of withdrawal is employed and the red-cell suspension is transfused immediately or within a very few hours, the risk of infection is not increased.

The decision to transfuse a patient should take some account of the quality as well as the quantity of blood to be used. It appears that, apart from exchange transfusion in infants, a wider use could with benefit be made of blood whose true hæmatocrit has been raised to 50–55%.

Dewsbury General Hospital. M. CORRIDAN.

P.A.S. AND THE PATIENT

SIR,—With reference to the excellent paper by Dr. Dixon and his colleagues (Nov. 2), I have carried out a check on the urine for p-aminosalicylic acid (P.A.S) in 50 consecutive male patients. All these patients are on domiciliary oral therapy with P.A.S. and isoniazid in cachets. All were on a dosage equivalent to 12 g. of P.A.S. a day. A single specimen of urine was checked on the patient's routine attendance at the chest clinic. The test agents used were hypochlorite solution ('Milton') and Ehrlich's reagent. A specimen was accepted as negative if it did not react to both reagents. Of those tested, 39 (78%) gave a positive reaction. This is a considerable improvement on the 58% of Dr. Dixon and his colleagues, though it does not invalidate their general conclusions.

In addition, the picture may be brighter than they care to paint it. Many patients, I suspect, are given treatment today mainly as a prophylactic measure, and in some of these the lesions may have already healed. I know from previous experience of using these P.A.S. tests that many defaulters are only intermittent. Therefore, I would not agree that once a chemotherapeutic defaulter, always a defaulter.

Taking the picture as a whole, I think all chest physicians would agree that there has been an enormous reduction in the general breakdown-rate with subsequent return cases.

I am not keen on streptomycin given to outpatients for long periods. The incidence of labyrinthine damage in people over the age of 40 is still a factor to be reckoned with. In addition the occasional severe sensitivity reaction or subcutaneous abscess due to inadequate domiciliary sterilisation occurs.

All my patients are on treatment for a minimum of twelve months.

I suggest a more suitable arrangement would be repeated spot checks of the patient's urine at irregular intervals, and, if he proves to be a *persistent* defaulter, either stopping treatment or taking him back into hospital.

Chest Clinic,
Newcastle upon Tyne. P. O. LEGGAT.

THE NEW CHINA

SIR,—May I, as one who has had the privilege of working here for the past three years, congratulate Dr. Fox on the visual and mental acuity which has enabled him, in less than four weeks, to see and comprehend so much of the medical services of New China.

While I cannot agree with some of his interpretations, in the main I think his account is fair and accurate. I particularly agree with his conclusion that there is a very wide area in which cooperation between the British and Chinese medical professions is both possible and mutually desirable.

As Dr. Fox has pointed out, things move fast over here. For example, in the few weeks since Dr. Fox returned home, the wish that he expressed (Nov. 16, p. 995) that a campaign against spitting would be initiated, has materialised and now all the instruments of public persuasion—including the street committees—explain the dangers of spitting and urge the people to refrain. Of course, he is wrong to say that the provision of spittoons positively encouraged spitting—they merely encouraged the use of spittoons rather than the floor. That was the first step in combating this age-old habit. The next step was to provide covers for the spittoons and the final step has just been initiated.

This step-by-step approach, leading the people rather than pushing them, characterises much of the technique of the Chinese Government.

While it would not be appropriate, in these columns, to enlarge on some of the political issues which Dr. Fox raises, I feel it necessary to question his conclusion that a poster in a hospital corridor (not a patient's thoroughfare) criticising a doctor on the staff, must be either childish or deadly. Certainly we would be surprised to see such a poster in a British hospital, but that does not preclude other estimations. Surely Dr. Fox himself provides the answer in his very next paragraph when he says that the power of the regime to change people's thinking "is the chief reason for its remarkable achievements, in medicine as in much else." There is much truth in this. In the final analysis, the way in which people think, the way they see their relationships with each other, with society and with the burning issues of the day, has a decisive influence.

With Liberation, the Chinese Government not only faced the tasks of eliminating landlordism, usury, poverty, prostitution, opium smoking, and a host of other evils. It also had to eliminate the bad effects of these legacies of the past, from the thinking of millions of people. The public criticism of the doctor in question was part of this process, taking a form suited to present conditions.

Some of my professional colleagues have been subjected to strong public criticism. It has been a source of amazement to me, that not only have they emerged unscathed from this experience, but that they—like the rest of us—have greatly benefited from it. Their work has improved and their relations with their erstwhile critics have become friendlier and more solid. Such criticism, motivated by a desire for greater unity, can go a very long way towards dissipating those half-hidden fears, personal ambitions, rivalries, and frustrations which are a commonplace in many societies. To characterise this as "heresy hunting" is to fail to understand its great and unique potential for good.

Finally I cannot agree that the passage which Dr. Fox quotes from Mao Tse-tung, can be interpreted as "discouraging, for our time at least, the very thought of human brotherhood." I would have thought that exactly the opposite was true. By showing that it is precisely the division of society into antagonistic classes, which, in the past, has always prevented human brotherhood, and at the same time showing how the Chinese people can eliminate these class divisions, surely Mao opened up a very real prospect of such brotherhood in our time.

I am sure that Dr. Fox's brief stay in China was enough to convince him that, in the 15 years since the lines which he quoted were written, China has in fact advanced

very far along the road to human brotherhood, and that peace and the sympathetic support of our country and our profession, can help smooth the road which still lies ahead.

Peking Medical College Hospital. J. S. HORN.

HELP FOR POLISH PATIENTS

SIR,—Few countries have suffered as Poland has done during the past twenty years. Of all the refugees from that country to ours none can claim our sympathy and support more insistently than the 1500 Poles who, not surprisingly since they have lost home, family, and possessions, are under treatment in mental hospitals in England and Wales.

The generosity of readers of the British Press has enabled us for three years to send to each of these sufferers a parcel at Christmas and to arrange for many of them a series of friendly visits throughout the year. In many cases their hospital treatment is successful, and their doctors tell us that the help given them in their loneliness really contributes to bringing about their recovery. But as some get better, others fall sick, so the need for our Association's work continues. We, therefore, as Christmas approaches, again ask for the contributions of your readers to this merciful work.

Association of Friends of Polish Patients, 14, Collingham Gardens, London, S.W.5.

RICHARD FORT
President
A. R. N. ROBERTS
Chairman.

BEHAVIOUR STUDIES IN MEDICAL RESEARCH

SIR,—May I reply to Dr. Broadhurst's letter of Nov. 9, since I find it difficult to comprehend.

In his own words, " it is surely incorrect to assert " that I implied that modern research into mammalian behaviour was without any organising principles. I would certainly agree that Hull's theories are most valuable in the study of learning. However, it is an assumption with little foundation other than the history of ideas behind it that the study of learning is more appropriate to mammals than to any other group of animals.

Lashley has told me in a private communication that many types of animal are capable of learning after one experience, provided this experience is of the appropriate kind.

My purpose was to point out that without complementary studies of fixed patterns, whether they be hereditary in origin or acquired during development, we lack an essential piece of knowledge for planning studies of mammals whether of these elements themselves or of learnt behaviour. In the latter instance to know the built-in rewards is at least to increase our knowledge of how to induce learnt responses.

To suggest that ethological investigations are " more applicable at lower phylogenetic levels, as in birds, fishes, and insects " is merely to be dazzled by their prominence in these animals and does not argue that they are inoperative because less apparent in the mammal. I cannot find any biologically adequate reason for assuming that they play an unimportant part.

May I ask, in summing up my difficulty in understanding the purport of Dr. Broadhurst's letter, how one can define human behaviour by objective observation. This he seems to consider to be a surer method, or a more valuable method, than acquiring knowledge of the patients' subjective experience from what they say. This belief, of course, is very widespread and is one of the important misconceptions preventing any advance in our understanding of the part that psychoanalysis can play in the study of animal behaviour and in therapy.

We should recognise that in tackling subjective experience psychoanalysts are attempting to reach the intentions and unexpressed wishes. When understood, these will give us as good an insight as we are likely to get into social behaviour as any possible resort to an arbitrarily styled " objective " observation.

Supposing we were to compare the behaviour of animals with that of man by observing the relevant parts. Morris [1] points out the flight, fight, and mating behaviour form a complex which is probably basic to the systems organising our social behaviour and it is these with which we are concerned. Imagine then the problems of a scientifically minded " Peeping Tom " ! Beside them the present difficulties of psychoanalysis are child's play.

Department of Pharmacology, University of Birmingham. M. R. A. CHANCE.

HUNTING THE NEEDLE

SIR,—I should like to corroborate what Prof. Lambert Rogers said in his article of Oct. 19.

During the past two years I have removed metal foreign bodies with the Berman locator with excellent results. Some of these cases had been previously explored unsuccessfully before coming to me.

The objects removed varied from a particle of metal, the size of a grain of sugar, from an interphalangeal joint, to a needle in a chest wall, neck, or limb. The procedure we adopt is as follows :

(1) Anteroposterior and lateral X-ray views.
(2) Location by the detector and marking the site with Bonney's blue immediately prior to anæsthesia.
(3) Once in theatre, and whenever possible on a bloodless field, the incision is made, the detector is again brought into play inside the wound, and one is able to retrieve the object with little difficulty.

As we do not possess a machine of our own, the Royal Victoria Infirmary, Newcastle upon Tyne, kindly loans us their detector at regular intervals. There have been, however, occasions when a metal foreign body requires immediate removal—e.g., needle in sole of foot, when the patient is very much incapacitated, one wishes for a detector in every casualty department.

The Berman machine is an American one, but I understand that a Newcastle firm is now in the process of manufacturing a detector.

Queen Elizabeth Hospital, Gateshead, 9. A. MOSELHI.

MUNCHAUSEN'S SYNDROME

SIR,—Having been responsible for vetting emergency admissions at this hospital for three years, I have seen a number of patients in this category and keep records of them all.

They present a very real problem for the young and possibly recently qualified casualty officer who can easily be deceived by the skill with which they simulate serious organic disease.

One such patient whose peregrinations I followed had been occupying beds in fifteen different hospitals for a total period of at least forty weeks between November, 1949, and May, 1956. This must have cost the health service at least £600—a point worth considering.

It would be of assistance to casualty officers and others responsible for seeing emergency admissions to have some central record of these patients to which they could refer when in doubt. Such records are kept at many hospitals, but it would be more satisfactory if they were combined and kept at some central point, possibly the Emergency Bed Service headquarters. A telephone call at any time would then establish whether a patient was a known case of Munchausen's syndrome and which hospitals he had previously attended.

These facts together with the clinical condition of the patient would help to make a firm diagnosis and possibly avoid unnecessary admission.

Admission of these patients to hospital for psychiatric assessment is seldom of much help as they are in the main psychopaths or high-grade defectives. Outpatient psychiatric appointments are almost invariably refused.

The Middlesex Hospital, London, W.1. D. G. H. SYLVESTER.

1. Morris, D. J. L'instinct dans le comportement des animaux et de l'homme. Paris, 1956.

TOO MANY DOCTORS?

SIR,—It is surprising that there has not been more comment in the medical press on the suggestion that the intake into the medical schools in Great Britain should be decreased by about 10%.

It is doubtless true, as has been stated,[1] that applicants for general-practice vacancies average nearly 40 a vacancy, and it is certainly true of the applicants for consultant posts in the hospital service.

When one looks at the junior hospital posts, however, the converse is the case and, as this Association stated in its evidence before the Commission, these vacancies can only be filled by employing doctors from other countries. By reducing the number of graduates from British medical schools and universities this position will become still more marked, and my Association regards this as highly undesirable from every point of view.

The need is for more posts at the top and not for fewer posts at the bottom.

If there is to be a reduction of 10% on entry of students into British universities and medical schools, we feel that there should be an equivalent quota placed upon the entry of graduates from Southern Ireland (and other countries) to this country.

We also feel that the entry of postgraduates from medical schools in the Dominions and Eire, and the possibility of settling here, has been overlooked.

There is much to be said for the view of the B.M.A. Scottish Committee [2] that a decision should be postponed for five years. At least we hope that the Government will take the advice in your leader of Nov. 23 and leave the profession full responsibility for acting or not acting on the recommendations before it.

V. COTTON CORNWALL
Joint honorary secretary, Regional Hospitals' Consultants and Specialists Association.
London, W.C.2.

CATHETER FOR EXCHANGE TRANSFUSION

SIR,—In 1956 Dr. R. L. Denton, of Montreal, kindly drew our attention to the advantages of a new type of plastic catheter for exchange transfusion via the umbilical vein. This catheter is a polyvinyl tube originally devised for the feeding of premature infants, but also admirably suited to the catheterisation of the umbilical vein.[3]

The catheter consists of a length of transparent polyvinyl tubing; one end is moulded to a plastic luer socket into which any luer nozzle will fit. The other end of the catheter is sealed into a rounded tip. Just proximal to the tip there are two holes in the wall of the tube.

The catheter has the following advantages over a simple length of polyethylene tubing:

(1) Because of the great flexibility of the tube, movements of that part which lies outside the umbilical vein are not transmitted to the part lying inside the vein. Thus, when a suitable position for the catheter within the vein has been found, the position is easily maintained; the stillness of the tube within the vein helps to avoid spasm.

(2) The smooth rounded tip of the catheter makes it easy to introduce and is a safeguard against perforation of the umbilical vein.

A clot occasionally forms in the distal (closed) end of the tube, and the clot may spread proximally and occlude the two lateral holes. If this happens the catheter must be withdrawn and rinsed out with heparin-saline solution.

The catheter is designed to be expendable but may, if desired, be re-sterilised by boiling. Care must be exercised in handling the catheter when it is hot, since it is then easily deformed.

The original catheter is manufactured by the Pharmaseal Laboratories, Glendale 1, California, U.S.A., and is the K-31 expendable, plastic infant-feeding tube. Similar tubes are manufactured in this country by Capon Heaton & Co. Ltd., Hazelwell Mills, Stirchley, Birmingham, 30, and by Edwards Surgical Supplies, 83, Mortimer Street, London, W.1.

P. L. MOLLISON
J. P. M. TIZARD.
Hammersmith Hospital, London, W.12.

1. Andrews, J. R. *Brit. med. J.* Nov. 20, 1957, suppl. p. 184.
2. *ibid.* Nov. 16, 1957, suppl. p. 153.
3. Fischer, C. C., Agerby, H. A. *Pediat.* 1956. 17, 449.

INFANTILE GASTROENTERITIS

SIR,—I have read the article by Dr. Brown and Dr. Bailey (Dec. 14) on *Esch. coli* gastroenteritis with interest. By and large their experience has been similar to ours, with one exception. We have not been nearly so impressed with the therapeutic effectiveness of antibiotics in this condition. They certainly reduce the number of organisms excreted and thus may lessen the risk of cross-infection, but I believe there has been a lessening of virulence of the disease over the last twenty years. The small number of babies requiring rehydration on admission to hospital is evidence of this. In fact we now find it difficult to give our residents experience in learning the technique of "drips" during their stay.

I do not think therefore that the statement in the summary of their paper that "the use of antibiotics has greatly simplified treatment" should be allowed to pass unchallenged. Too much faith in antibiotics may be dangerous in this as in other conditions.

A. G. WATKINS.
Department of Child Health, Welsh National School of Medicine, Cardiff.

TRICHOMONAS VAGINITIS

SIR,—Much of the value of the paper by Dr. Stewart and his colleagues (Nov. 23) is lost through three discrepancies.

(1) Although two 'Locan,' or two acetarsol pessaries, were prescribed daily in two of the three series, the patients included in the 'Penotrane' series were instructed to insert only *one* pessary at night. It is only fair to point out that the makers' recommended dosage has been, and is, *two* penotrane pessaries at night for fourteen days.

(2) The second unfortunate factor concerns the selection of patients. In the locan series in the clinical trial, "All patients with trichomonas vaginitis (with or without any additional infection) were included, *except those who were professionally promiscuous*" (my italics), whereas "The controls were unselected and consisted of 66 patients taken consecutively from those attending the clinic."

(3) There is no mention of clinical reactions to the drug used except in the sentence "Only 1 patient, however, complained of any symptom which she attributed to the treatment itself. This was a Negress with irritation of the vulva; she continued treatment and was controlled by the second course." I may have been unlucky, but in the few cases I have seen treated (not more than 12) I have encountered 3 severe cases of local vaginitis and moist eczematous dermatitis of the vulva after the use of locan pessaries.

I have recently used penotrane in a series of 125 consecutive patients attending the leucorrhœa clinic of the Edinburgh Infirmary and Elsie Inglis Maternity Hospital. I have found it as effective as any other preparation used topically in the treatment of trichomonal vaginitis, and better than most. It is notoriously difficult to assess the value of any drug in this condition, but further investigation on the lines suggested by Dr. Stewart and his colleagues, may well advance our, at present incomplete, understanding of this uncomfortable and socially distressing condition.

MARJORIE MURRELL.
Royal Infirmary, Edinburgh.

SIR,—I read with interest the article by Dr. Stewart and his colleagues on the treatment of trichomonas vaginitis with 'Locan' pessaries containing amethocaine, amylocaine, and benzalkonium chloride.

I have used this preparation in the treatment of 31 patients, ranging in age from 22 to 80 years, whose presenting symptoms were vaginal discharge and vulval

irritation ; and this small series confirms the efficacy of these pessaries against trichomonas.

In each case there was prompt relief from pain and irritation, with healing of vulval excoriation. This combination of drugs seems to have also a wide bactericidal range against organisms commonly associated with vaginal discharge ; and the pessaries may prove of value in the routine toilet of the vagina before vaginal operations.

After examination to exclude underlying structural disease, vaginal swabs were taken, and then the patients treated themselves at home by the introduction of a locan pessary high into the vagina each night for three weeks. After a further week without treatment the patients were re-examined and vaginal swabs again taken.

The following list shows the pathogenic organisms present, singly or in association, before and after treatment.

Organism	*Before treatment*	*After*
Trichomonas	7	None
Diphtheroids	4	None
Monilia	3	1
Non-hæmolytic strep.	3	None
Hæmolytic strep.	3	None
Proteus	2	2
Esch. coli	1	3
Staphylococci	1	None
Coccobacilli (*Hæmophilus vaginæ*)	1	None
Micrococci	1	1

Department of Obstetrics and Gynæcology, Hillingdon Hospital, Middlesex. H. C. PERRY.

URINARY PROTEIN IN MYELOMATOSIS

SIR,—In his letter of Sept. 21 Mr. Cummings reports the occurrence of multiple electrophoretic components, with the mobility of γ-globulin, in the urine of a patient with myelomatosis. In the case described, the serum-myeloma-globulin also had the mobility of a γ-globulin, so it is possible that one of the urinary components was the serum-myeloma-globulin.

In analysing serum and urinary proteins by paper electrophoresis (veronal buffer ; pH 8·6), I have come

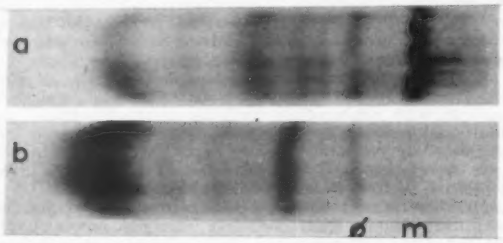


Fig. 1—Electrophoretic patterns of (a) plasma and (b) urine from a patient with myelomatosis : m indicates serum-myeloma-globulin ; ϕ indicates fibrinogen. Two β-globulin components in plasma (or serum) are a normal finding (fig. 2a).

across a few patients with myelomatosis whose urine contained protein but gave negative results when examined for Bence Jones protein in the manner recommended by Snapper et al.[1] In one of these cases [2] the urinary protein was excreted in relatively large amounts (5–10 g. per 24 hours), was electrophoretically homogeneous, had a molecular weight (ultracentrifuge) of about 35,000, and was presumably an atypical Bence Jones protein. This, incidentally, illustrates the value of paper electrophoresis in the demonstration of Bence Jones proteinuria. In the other cases, however, the urinary electrophoretic pattern contained components corresponding to the main serum- (or plasma-) protein fractions with, in addition, a component corresponding in each case to a discrete component in serum (or plasma ; fig. 1). It is tempting to conclude that the discrete urinary components in these cases were, in fact, serum-myeloma-globulins which had escaped into the urine along with other plasma-proteins as a result of renal damage, though one cannot rule out the possibility that the urinary components were atypical Bence Jones proteins with mobilities coincidentally the same as the serum-myeloma-globulins.

Fig. 2—Electrophoretic patterns of (a) normal serum and (b) serum and (c) urine from a patient with myelomatosis.

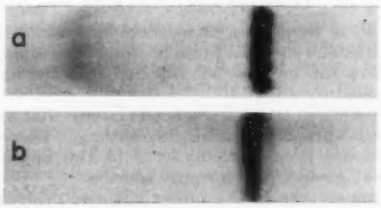


Fig. 3—Electrophoretic patterns of (a) serum and (b) urine from a patient with myelomatosis.

In a case of myelomatosis with Bence Jones proteinuria, a single urinary component corresponded electrophoretically to a minor serum component migrating between α_2- and β-globulin (fig. 2). It is also tempting to conclude that the abnormal serum component in this case was Bence Jones protein.

In each of two further cases with Bence Jones proteinuria, electrophoresis revealed two discrete urinary components. In the first case (fig. 3), the urinary protein consisted of a major component with a mobility slightly greater than that of a serum-myeloma-globulin and a minor component with a slightly smaller mobility. In the second case,[3] the electrophoretic pattern contained two discrete components in the γ-globulin region along with other components corresponding to the normal serum-proteins. The serum in the latter case contained an α_2-myeloma-globulin.

Department of Biochemistry, University of Melbourne. J. A. OWEN.

ADRENALINE FOR VOMITING OF PREGNANCY

SIR,—Dr. Eccles (Aug. 3) reminds us of the anti-emetic action of adrenaline hydrochloride given orally in 1% solution, which was discovered some 40 years ago.

It is generally known that adrenaline by mouth has no effect on the blood-pressure, &c. Its selective action on the intestine, analogous to its local relaxing action on the bronchi (by means of spray), was discovered by me in 1915 [4] during an epidemic of dysentery. Oral administration of the 1 in 1000 solution (10–20 drops in some water several times daily) had absolutely no toxic effects, but relieved my patients of their abdominal pains, hiccups, and vomiting. Since that time oral adrenaline has been in continual use in my hospitals and clinics for children in the relief of cases of excessive peristalsis and vomiting, with mostly dramatic, though transitory, effects.

Research Institute for Mother and Child, Warsaw, Poland. FR. GROËR.

1. Snapper, I. et al. Multiple Myeloma. New York, 1957.
2. Owen, J. A., Rider, W. D. *J. clin. Path.* 1957 (in the press).
3. Owen, J. A., Rider, W. D. *Blood*, 1958 (in the press).
4. Groër, F. *Münch. med. Wschr.* 1915, **63**, 487.

IMPORTANCE OF THE ILEUM IN THE ABSORPTION OF VITAMIN B_{12}

SIR,—The observations made by Dr. Trevor Cooke and his colleagues last week and those of other workers whom they quote suggest that the site of vitamin-B_{12} absorption in *man* is in the ileum. Our own unpublished observations on the absorption of labelled vitamin B_{12} in patients with partial resection and localised disease of the small intestine support this view. We wish to stress that the differing opinions to which Dr. Trevor Cooke and his colleagues refer are solely concerned with the question of whether vitamin-B_{12} absorption in the *rat* occurs in the proximal small intestine in addition to the middle and distal parts (see Dr. Booth and Dr. Mollin's letters of Nov. 16 and 30 and our letters of Nov. 23 and Dec. 7). This would appear to be largely a question of different usage of the term "proximal" in relation to experiments on the small intestine.

Department of Medicine,
University of Edinburgh.

R. H. GIRDWOOD
ANDREW DOIG.

TREATMENT OF CHRONIC BRONCHITIS

SIR,—It seems incredible that the article by Dr. Moyes and the late Dr. Kershaw (Dec. 4) about the treatment of chronic bronchitis should make no mention whatsoever of cigarette smoking. After all, the mortality-rate from this disease is six times as great in "heavy" smokers, three times as great in "moderate" smokers, and twice as great in "light" smokers, as in non-smokers.[1] Before any expensive drug therapy is prescribed for this condition, "no smoking" must surely be the order? May we therefore ask Dr. Moyes for details of his patients' smoking histories—past and present please? Without this information the proper assessment of his prednisolone therapy is impossible.

Leicester.

J. P. ANDERSON.

PRODUCTION OF FIBRINOLYTIC ACTIVITY WITHIN ARTERIES

SIR,—Dr. Fearnley and Dr. Ferguson, in their preliminary communication of Nov. 23 entitled Arteriovenous Difference in Natural Fibrinolysis, considered that their interpretation of the findings reported was in accord with the results of experimental observations made in this department. This is misleading. It has never been our thesis that fibrinolysis developed only in veins. Indeed in one of the papers [2] quoted it was stated that, following restoration of the circulation in a limb previously rendered ischæmic, "the major fibrinolytic activity develops either in the capillary bed or in the arterial tree within that part of the limb subjected to arrest of the arterial supply".

The investigation of the latter possibility has proved exceedingly difficult. It has been shown that fibrinolytic activity develops within veins in response to a variety of stimuli.[2–4] As was to be expected arteries have been found to respond in the same way as veins, but they do so with even greater intensity especially in what would appear to be the reflex production of activity in other vessels in the homolateral and contralateral limbs.[5] Regrettably local anæsthetics (procaine and lignocaine) have been found [5] to be potent stimulants to the development of fibrinolytic activity within both arteries and veins. The fibrinolytic activity of a specimen of blood obtained by arterial puncture performed under local anæsthesia is therefore largely a measure of a complex response by the arterial tree to the local anæsthetic.

Because of a number of factors, one of which is the rate of flow in the artery, this measure does not accurately represent the total activity imparted to the blood. The fibrinolytic activity in blood obtained from veins either in the same limb as the anæsthetised arterial segment or in the contralateral limb has proved even more complicated in its origins. Since in my opinion arterial puncture without local anæsthesia is unjustified the difficulties in controlling a study of the development of fibrinolytic activity within arteries in humans seem insurmountable at the moment.

University Department of Medicine,
Queen Mary Hospital,
Hong Kong.

A. J. S. MCFADZEAN.

A DIAGNOSTIC SIGN

SIR,—May I direct attention to the significance of brown markings on the skin of the abdomen due to hot-water-bottle burns?

In my patients with these markings there have been complaints of severe pain and, at laparotomy, I have always found an organic cause for the pain even when other investigations, both radiological and pathological, had failed to reveal any abnormality.

Sydney Hospital and the
St. George Hospital, Sydney.

EDWARD WILSON.

FULMINATING INFLUENZA

SIR,—The following example of Waterhouse-Friderichsen syndrome in a fatal case of influenza may be of interest in view of the findings of Dr. Roberts (Nov. 9) and the opinion expressed by Dr. Librach (Dec. 7), on the rarity of this condition except in meningococcal infections.

A girl, aged 3, was perfectly well at 7.30 P.M. when she had been watching television. Two hours later she woke up with pain in the left arm, after which she became breathless and delirious. She was treated with penicillin and sulphonamides, and next morning was admitted gravely ill to hospital, where she died shortly afterwards.

At necropsy the lips were cyanosed and the skin showed many petechial hæmorrhages and ecchymosis. There was only surface congestion of the brain, and no evidence of meningitis. The trachea was bright red, but the epithelium was intact. The lungs were deeply congested, but there was no evidence of bronchopneumonia. The only other positive finding was massive bilateral adrenal hæmorrhage. To the naked eye no functioning adrenal tissue remained.

Blood-culture during life had yielded staphylococci (coagulase-negative) only. Swabs taken at necropsy from the left lung gave a scanty growth of *Staphylococcus aureus* (coagulase-positive). There was also a heavy growth of *Hæmophilus influenzæ* from a tracheal swab. Influenza virus A was isolated from a portion of lung.

On histological examination, the lung showed marked congestion of the alveolar walls and œdema. Many spaces contained an early fibrinous inflammatory exudate. The bronchiolar mucosa was intact.

Histological examination of the adrenals showed only a minimal amount of functional adrenal tissue, with heavy intercellular hæmorrhage.

This seems, therefore, to be a case of acute adrenal hæmorrhage, with no evidence of meningococcal infection, in which influenza virus A was isolated from the lungs.

I should like to thank Dr. R. R. Gordon for the clinical details of this case, and Dr. J. E. M. Whitehead for the virological examinations.

Group Pathology Laboratory,
City General Hospital,
Sheffield.

A. J. N. WARRACK.

SIR,—I should be grateful if you would allow me to clarify the point of my letter (Nov. 23) to Dr. Rawlins (Dec. 7).

Tracheotomy may be a lifesaving measure in fulminating influenza. This is agreed. Bronchoscopy is a very different matter. This is of fundamental importance. A second, third, and fourth bronchoscopy may well be

1. Doll, R., Bradford Hill, A. *Brit. med. J.* 1956, ii, 1071.
2. Kwaan, H. C., McFadzean, A. J. S. *Clin. Sci.* 1956, **15**, 245.
3. Kwaan, H. C., McFadzean, A. J. S., Lo, R. *ibid.* 1957, **16**, 241.
4. Kwaan, H. C., McFadzean, A. J. S., Lo, R. *ibid.* p. 255.
5. Kwaan, H. C., McFadzean, A. J. S., Lo, R. Data to be published.

inevitable, but is a first? If Dr. Rawlins is describing subsequent bronchoscopies his excellent descriptions of the bronchial tree at bronchoscopy seem to confirm my view on the initial traumatic nature of this procedure.

The fact that a patient with fulminating influenza should survive bronchoscopy seems a poor criterion for universal recommendation of this procedure in the future.

Repton, Derby. D. W. S. SHELDON.

MUSSELS

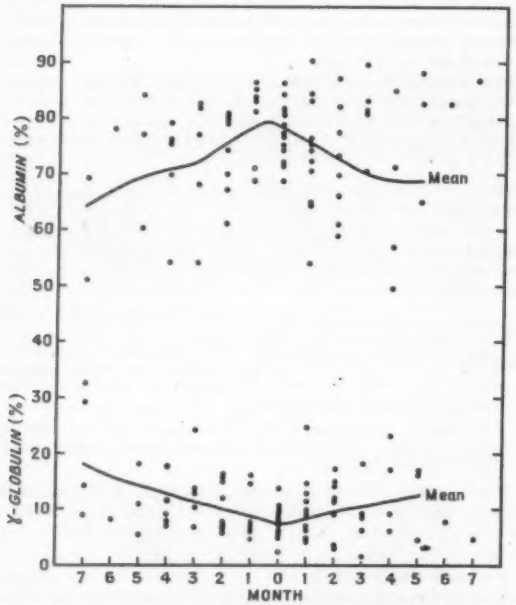
SIR,—I read with considerable interest your editorial of Oct. 19. Besides the points you make, I believe that there is also a toxic euglobulin factor in injured tissue of invertebrates. This material seems to be comparable to the toxic euglobulin which I have extracted from the inflammatory exudates of vertebrates and which I have termed "necrosin".[1] It is quite possible that many of the toxic reactions displayed by people fond of sea food may be referable, at least in part, to this substance.

Agnes Barr Chase Foundation for Cancer Research, Philadelphia. VALY MENKIN.

SERUM-PROTEINS AND CEREBROSPINAL-FLUID PROTEIN IN TUBERCULOUS MENINGITIS

SIR,—The correlation between changes in serum-proteins and the course of tuberculosis in childhood has often been discussed. We studied 13 children, aged 4 to 10 years, suffering from tuberculous meningitis during the whole course of the disease, to observe the correlation between the changes of the serum-proteins and the cerebrospinal-fluid protein.

All children were treated with streptomycin and isoniazid. The time-curves obtained by paper electrophoresis were



Changes in serum-albumin and serum-globulin in relation to protein in the cerebrospinal fluid in children with tuberculous meningitis. O indicates the point at which the protein test became negative.

mostly of the same type. It was found that there were three phases in the changes of the serum-protein fractions.

As a rule in the *initial phase* the albumin concentration was normal, and low levels were exceptional. At the same time the proportion of gamma-globulin was increased, and the alpha- and beta-globulin levels were somewhat decreased. No observations were made at the very beginning of the disease, since most patients were admitted to hospital a few days or weeks after the onset.

In the *second phase* there was a close and significant correlation between the changes of the proteins in serum and C.S.F. There was a progressive increase in albumin, but gamma-globulin was much decreased. When the albumin exceeds the normal value and the gamma-globulin reached its lowest level, the protein test in the C.S.F. became negative (see accompanying figure).

It is obvious that the C.S.F.-protein test does not become negative at a constant stage in tuberculous meningitis: in some cases it becomes negative after three months', in others after eight months', treatment. The correlation we have demonstrated, however, is independent of the time factor and is manifest only when the C.S.F.-protein test becomes negative. As a rule, several days or weeks of treatment are necessary to reach this stage.

In the third phase, when clinically the child has recovered, the serum-albumin may still be high. As it decreases, the gamma-globulin level rises to values even higher than normal.

The correlations we have observed may be an aid in diagnosis and prognosis.

1st Department of Pædiatrics, Medical School, University of Budapest. Z. ERDŐS, B. BENCZE, E. UGRAY.

1. *Physiol. Zoöl.* 1949, **22**, 124.

LIPOPROTEIN PATTERNS IN MYOCARDIAL INFARCTION

SIR,—I read with interest Dr. Dagnall's comments (Nov. 30) on serum pre-β-lipoprotein which was examined by Dr. Smith (Nov. 9) in her work on myocardial infarction. As Dr. Dagnall points out, if serum be left at room temperature for a day or more, the electrophoretic mobility of the β-lipoprotein is increased, and may be confused with pre-β-lipid; this was the subject of a study by Gottfried et al.[1]

As shown by Dr. Smith and her colleague Dr. Dangerfield, β-lipoprotein can be distinguished from pre-β-lipid by a four-minute ethanolic extraction of the unstained electrophoretogram, when most of the β-lipoprotein is removed, whereas the pre-β-lipid is not.[2] This work suggests that pre-β-lipid is a genuine serum component and not an artefact due to ageing of the serum.

Chemical Pathology Department, St. George's Hospital Medical School, London, S.W.1. G. FRANGLEN.

ACTION OF GLYCOSIDES ON ACTOMYOSIN

SIR,—It is known, mostly from the studies by Szent-Györgyi and his associates, that the contractile element of muscle is actomyosin, a combination of actin and myosin, of which actin is the active protein. Myosin either contains adenosine-triphosphatase (A.T.P.-ase) or is identical with it. A.T.P.-ase is the activating enzyme of A.T.P., which in turn causes the polymerisation of actin. When actin polymerises, the muscle relaxes; when it depolymerises, the muscle contracts. The effect of various biologically active substances can be studied by viscometric measurements of polymerisation.

Horvath et al.[3] were the first to study the effect of cardiac glycosides on the polymerisation of actin, while Zador[4] started the investigation of the effects of steroids on the same protein. Since cardiac glycosides contain steroid rings in their structure, these substances also became involved in the investigation. It was found that some steroids and all cardiac glycosides so far tested stimulated the polymerisation of actin—the former being active on striated actin, the latter on cardiac actin. The theoretical implications and a possible action-mechanism of the steroids on muscular contraction have been postulated and discussed at length.[4,5]

1. Gottfried, S. P., Pope, R. H., Friedman, N. H., Akerson, I. B. di Mauro, S. *Clin. Chem.* 1955, **1**, 253.
2. Dangerfield, W. G., Smith, E. B. *J. clin. Path.* 1955, **8**, 132.
3. Horvath, I., Kiraly, C., Szerb, J. *Nature, Lond.* 1949, **164**, 4175.
4. Zador, S. Unpublished work.
5. Zador, S. *Jap. J. Pharmacol.* 1956, **6**, 11.

Although this proved a good working hypothesis, it revealed many discrepancies as a general theory. A number of drawbacks are overcome when this theory is viewed in the light of the results of Waser's,[6] who investigated similar problems using actomyosin instead of actin.

According to Szent-Györgyi, all types of muscle have the same basic active structure (i.e., actomyosin, actin, myosin). Zador thought that steroids acted as some type of bio-activator on the contractile protein in the contraction cycle. If this were so, then steroids ought to be effective on all types of actin (striated, cardiac, &c.). This, however, has not proved to be the case: cortisone was tried on both striated and cardiac actin, but found to be active on striated actin only, and to have no effect at all on cardiac actin.[7] It was also found that cardiac glycosides were active on cardiac actin only, without affecting striated-muscle actin.[3 4]

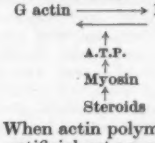
But when actomyosin was used instead of actin (i.e., the situation in vivo), cardiac glycosides were effective on both types of muscle. Waser also found that cardiac glycosides were bound to actomyosin. These results provide a substantial support for the above hypothesis.

Waser, on the basis of his experiments, came to the same conclusion as Zador—namely, that the cardiac glycosides (and other steroids [5]) exert their action on the proteins within the muscle cell and not on the cell membrane.

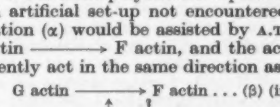
At this point an interesting fact has to be noted, and cannot be passed over: when actin is used on its own a certain tissue-specificity is observed with regard to steroids (cardiac glycosides act on cardiac actin, &c.). This tissue-specificity disappears, or rather, is non-existent when actin is coupled with myosin in the form of actomyosin as it is found in vivo. When this compound is separated and actin is dealt with alone in vitro this tissue-specificity appears.

Apart from the similarities with Waser's results, there were also some completely contrary findings—e.g., that cardiac glycosides decrease the polymerisation of actomyosin, though they increase the polymerisation of actin alone. How can this fact be explained? Perhaps the following suggestions may be of some value:

Steroids stimulate the polymerisation by acting perhaps as bioactivators along this line [5]:



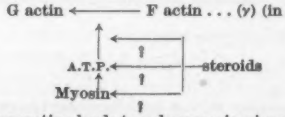
I. When actin polymerises separately from myosin (in vitro—an artificial set-up not encountered in vivo), the dynamic equation (α) would be assisted by A.T.P. only in the direction G actin ⟶ F actin, and the active steroids would consequently act in the same direction as well:



This reaction leads to an increase in viscosity.

(The effect of these substances on the direction is an experimental fact.[3 4 7])

II. When actin polymerises in actomyosin (as in vivo) the reaction, as in (β), would take place without any assistance from myosin (A.T.P.-ase) and steroids, while the G actin ⟵ F actin part of reaction (α)—i.e., the contraction of the muscle, or the active phase—would be assisted by myosin (A.T.P.-ase) and steroids. The point of action of the steroids could be between A.T.P. and actin, or on A.T.P., or on myosin:



This reaction leads to a decrease in viscosity.

6. Waser, P. G. *Science*, 1957, **125**, 739.
7. Cowle, J. B., Thorpe, R. H. *Nature, Lond.* 1953, **171**, 1067.

The possibility of the steroids exerting their action in either direction has been pointed out and discussed elsewhere.[5]

Actin and myosin are apparently closely interconnected, and, as far as physiological activity of the muscle-fibre is concerned, one cannot go further than this protein. Everything—from the physiological angle—is presented in and "packed" into actomyosin, and not into actin or myosin separately.

The study of biologically active substances on muscular contraction should therefore be confined to actomyosin rather than its two separate components. In other words, results obtained on the separate components alone cannot and should not be interpreted on a physiological level unless results obtained on actomyosin are also taken into consideration.

The key secrets of the properties of the muscle-fibre and the action-mechanism of muscular contraction, and of the various bioactive substances therein, are probably hidden in the actomyosin complex or in the manner of linkage of its two components, or both.

Scientific Services,
Snowy Mountains Authority, Cooma,
New South Wales, Australia. S. ZADOR.

SMOKING AND CANCER OF THE LUNG

SIR,—I pride myself that all my letters are "innocent looking" and I am exceedingly glad to note from your peripatetic correspondence last week that a recent one, prominently headed Smoking and Cancer of the Lung, is no exception. But I must hasten to correct any marital disharmony that in my innocence I may have promoted. If in November, 1951, the husband of your peripatetic correspondent was temporarily smoking 3 cigarettes a day, then he truthfully answered the question I put to him. For I had asked him, clearly and deliberately, what are your present habits? Before popping the question I had realised, as does your correspondent, that the present is not invariably a certain guide to the past (or future), that manic and depressive phases may succeed one another. But I had also realised, as, alas, your correspondent does not, that these "errors" of classification would inevitably *reduce*, and not exaggerate, any associations between smoking habits and mortality that I might subsequently find. In short the observation in this inquiry that mortality from lung cancer in "heavy" smokers has been some 20 times the rate in non-smokers understates the facts of life. A pity but there it is.

London. A. BRADFORD HILL.

P.S. I hope her husband has returned his second form. The answers really are useful.

THE ELECTROENCEPHALOGRAPH IN LIVER DISEASE

SIR,—I found Dr. Sherlock's reply to my letter of Nov. 23 unsatisfactory. She states that only 1 of the 62 patients was given ammonium chloride, but paragraph 4 on p. 867 (Nov. 2) commences: "A high-protein diet, ammonium chloride, and methionine were given." And again in the summary, "Deterioration of the electroencephalogram could sometimes be induced by increasing daily protein and administering methonium or ammonium chloride". True, table I does mention only case 1 as having received ammonium chloride, but only 7 of the 62 patients are listed in this table.

Even if ammonium chloride was given to only 1 patient, is even that one administration justified? Who can condone the giving of a noxious substance to a sick man, knowing it will cause severe harm?

In her reply Dr. Sherlock says "These were difficult problems of diagnosis". But the article (paragraph 2, p. 867) says: "The diagnosis was usually evident on clinical and biochemical grounds."

London, W.1. M. H. PAPPWORTH.

POSTOPERATIVE VENOUS THROMBOSIS

SIR,—Your leading article of Nov. 30 is a magnificent survey of current thought on this subject. The bibliography alone must have involved a great deal of research, and you are to be congratulated on a masterly and unbiased presentation.

I believe that we have sadly missed the boat in our prophylactic treatment of this condition. The answer is staring us in the face, but we are too concerned with details of diagnosis and with the development of surgical and pharmaceutical aids with which to lock the venous door after the clot has bolted. As you state, it is generally agreed that the leg veins are by far the most common site of origin of these thromboses. From this observation grew the practice of so-called "early ambulation" based upon the premise, with which I entirely agree, that the greatest single cause of leg-vein thrombosis is slowing of venous return in a postoperative or puerperal patient confined to bed—*but yet this has failed*, allowing you to state, quite justly, that "it is extremely doubtful whether the incidence of postoperative venous thrombosis is diminishing."

It has failed because we have not been practising "early ambulation", as we so fondly imagine, but *early stagnation*. To get a patient out of bed on the first, second, or third day, allow him to take a few shuffling steps along the ward and then collapse into a chair with his legs propped up on a stool, may permit the ward sister to write in the report "up for half an hour today" but does nothing to speed up venous return.

I am all for getting patients back to their normal skeletal functions in the shortest possible time, indeed I expect my own postoperative varicose-vein patients to be walking normally without a limp within twenty-four hours of an operation lasting an hour and a half under general anæsthesia; but if for any reason it is not possible to get them up on the following day I am not in the least worried, for they all have the foot of their bed raised 9 in. until they return home, and as they come round from their anæsthetic, usually as they are being lifted from trolley to bed, nurse tells them not to forget to move their ankles up and down. Being in a hypnotic state the suggestion takes root immediately, and until their stitches come out they instinctively "walk" in bed and thus pump up their venous return. When they are asleep the venous return is maintained by the tilt of the bed, for they are only allowed one pillow for their head.

With this regime I am quite happy even if they need to stay in bed for a fortnight. When patients *are* allowed up out of bed it is quite useless allowing them to shuffle around in slippers, this does them about as much good as standing in a queue. Unless you are wearing well-fitting shoes ankle movement is at a minimum and active venous return negligible. By the same token, postoperative patients must move their ankles up and down every now and again (as if beating time to music) when sitting in a chair.

This regime has the further merit in relieving one's mind of the previously inevitable worry when operating upon the superficial veins of patients with a past history of deep venous thrombosis (usually in the other leg), which in the course of practice I am frequently called upon to do.

What of those patients treated at St. Elsewhere's who do develop an early or established major leg-vein thrombosis? Here again current thinking lays far too much emphasis upon the pharmacology of anticoagulant treatment, instead of its physiological basis. I personally prefer heparin given in a dosage scheme whose modification depends upon the clinical progress of the patient rather than the uncertainties of the pathological laboratory. But whatever anticoagulant one uses it is not giving of its best unless combined with concurrent mobilisation of the patient. The true function of an anticoagulant is to prevent the spread of a thrombus whilst the patient is being educated in the principles of lower-limb venous return to the point where the speed of venous blood-flow seals off the proximal end of the thrombosed vessel. This can be done just as easily and safely "walking" in a foot-tilted bed if the patient is not in a fit state to ambulate on terra firma.

Turning finally to deep-vein ligation, I trust that except as a desperate lifesaving operation in the rare case, the prophylactic measures I have outlined will relegate it to small print in the textbooks of surgical history. Certainly it is not the relatively innocuous process that has been suggested by some. The site of ligation—i.e., whether proximal or distal to the profunda trunk—makes very little difference to the crippling sequelæ, as evidenced by the sad harvest we now see following the wave of enthusiasm for distal-profunda deep-vein ligations which swept the country some five years ago.

London, W.1. STANLEY RIVLIN.

A NIGHT HOSPITAL FOR THE TREATMENT OF NEUROSIS

Dr. JOSHUA BIERER writes from the Marlborough Day Hospital, London, N.W.8:

"In January, 1958, we are opening a night hospital for the short-term treatment and resettlement of neurosis cases. Both men and women will be accepted. Patients will arrive between 6 and 8 P.M., and treatment will include individual, group and social psychotherapy. An evening meal and breakfast will be available for patients who will normally leave between 7 and 9 A.M.

"It is hoped that these facilities will be particularly valuable for patients who are working, and special attention will be paid to the occupational aspects of each case. These facilities are being provided under the National Health Service, and cases for treatment are being considered now."

Parliament

Private Patients and the N.H.S.

ON Dec. 11 Mr. JOHN HALL sought to introduce a private member's Bill to enable private patients to obtain drugs, medicines, and appliances through the National Health Service. In 1953 the cost of medicines which might result from a Bill of this kind had been estimated by the Ministry of Health at £1½ million. Since then, despite the higher cost of medicines and allowing for the charges that had been imposed on the service, the number of private patients had fallen to such an extent that the present estimate was about £1 million. That estimate did not take into consideration the saving which would accrue when a private patient decided to take his treatment at home instead of being forced into hospital by the present high cost of medicines. Nor did it take into account the saving in time and money where patients had two doctors, and it had been reliably estimated that more than 50% of private patients had a National Health Service doctor as well. All in all Mr. Hall suggested that the additional cost might be £500,000.

As no measure which throws a charge on public funds can be introduced by a private member, Mr. Hall had included in his Bill a clause which made the cost of this proposal a charge on the National Land Fund. The Speaker ruled that procedurally this was in order. Whether it was feasible, he added, was not for him to say. But the feeling among members that this device was a subterfuge to avoid an important constitutional doctrine was so strong that it hindered the discussion of the Bill, and the Speaker finally asked Mr. Hall to allow him further time to consider the point. Mr. Hall agreed to withdraw it without prejudice to his right to reintroduce it.

QUESTION TIME

The Registrar Problem

Mr. DAVID GRIFFITHS asked the Minister of Health if he would set up an impartial committee with a lay chairman to examine the position of senior registrars' and consultants' posts.—Mr. DEREK WALKER-SMITH replied: I am already in consultation with the profession on the position of senior registrars

who have completed the normal term of service in the grade but have not obtained higher appointments. There is, therefore, no need for a special committee on the subject.

Mr. GRIFFITHS: Is the Minister aware that there are 400 senior registrars fully trained and, furthermore, they cannot get recognised for consultant posts? Is it not crystal clear that both the Ministry itself and the consultants' organisation have failed in their duty to these people?—Mr. WALKER-SMITH: The figure of 400 included the large groups who had either not completed four years' training or were unlikely to be seeking ordinary consultant posts. The latest figure available to me of senior registrars in this position was 90, together with another 136 who were in their fourth year of training and who might, therefore, encounter the same difficulties. I say that to put the figures straight, but, of course, I do appreciate that there is a real problem here.

Poliomyelitis Vaccination

Mr. J. D. CRONIN asked the Minister what so far had been the proportion of applicants for poliomyelitis inoculation to the total number who have been eligible to apply for it.—Mr. RICHARD THOMPSON, parliamentary secretary to the Ministry of Health, replied: Approximately 40% up to Sept. 30.

Mr. CRONIN asked the Minister if he would make arrangements for a third dose of poliomyelitis vaccine to be given, if desired, to those persons who have received, or who are eligible for, inoculation with poliomyelitis vaccine.—Mr. WALKER-SMITH replied: I will consider this in the light of further medical advice on the poliomyelitis vaccination programme which I expect to receive shortly.*

Medical-manpower Report

Mr. ARTHUR BLENKINSOP asked the Minister whether he would make a statement on the report of the Willink Committee.—Mr. WALKER-SMITH: The report is under consideration by the Government.

Mr. BLENKINSOP: Will the Minister at least bear in mind that it is extremely important to have the recommendations of the Royal Commission on doctors' pay before any action is taken, in view of the great need to ensure that there is a fully adequate and developing service for patients and that the Royal Commission might very well make recommendations on this matter?—Mr. WALKER-SMITH: The action at present being taken on the report is to bring it to the attention of the University Grants Committee and of the universities.

Mr. BLENKINSOP: Does that answer mean that the Minister is recommending the universities to take action on the basis of this report? That is a serious matter and affects the whole future development of the health service.—Mr. WALKER-SMITH: No, Sir. What it means is that the report is being brought to their attention so that they may study it and its possible implications.

Curfew at Rampton Hospital

Mr. N. N. DODDS asked the Minister, in view of the rule that adult patients in good health at the Rampton Mental Hospital must go to bed at 8 P.M., why they were required to go to bed at 7.30 P.M. even during the summer months.—Mr. WALKER-SMITH replied: In order that all patients may be in bed before the night staff come on duty at 8 P.M., preparations have to begin soon after 7 P.M.

Mr. DODDS: Does the Minister really believe that the best way to get adults healthy and back into the community is to send them to bed in the summer at 7.30 P.M. like naughty children?—Mr. WALKER-SMITH: It is not a question of being sent to bed at that hour like naughty children. Putting about 1000 patients to bed in these circumstances is a major operation which takes a good time to perform. The night staff is a much smaller force and could not adequately cope with this job.

Mental Nurses

The number of whole-time nurses in mental hospitals and mental-deficiency hospitals increased by 60 between September, 1956, and September, 1957. In the same period the number of part-time nurses increased by 20. The totals at the end of the period were 1702 and 546 respectively.

Royal Commission on Remuneration

The report of this commission is not expected to be ready until some considerable time after Easter.

* We understand that advice whether a third dose of the vaccine is necessary is being given to the Minister by the joint advisory committee of the Central Health Services Council after their meeting on Dec. 17.

Obituary

FLORENCE BARRIE LAMBERT

D.B.E., M.B. Durh., D.P.H., J.P.

Dame Barrie Lambert was for many years a member of the London County Council, and as chairman of its public-health committees had a great influence on the coordination and development of London's hospitals in the 'thirties.

Her father, Henry Thomas Lambert, was a solicitor of the coal-exporting firm of Lambert Brothers and she went to school in France. Later she trained as a nurse at the London Hospital and during the South African war she served as a sister with the Imperial Yeomanry Hospital. After her return to England she studied medicine at the London School of Medicine for Women, qualifying in 1906. The following year she took the D.P.H., for her chief interest was always public health. She was fortunate in being able to give much of her time to voluntary work and she became honorary director of the Central Council for Infant and Child Welfare and honorary secretary of the Central Committee for the Care of Cripples. These interests turned her attention to physical medicine, then a very new specialty, and after postgraduate study in the University of Stockholm, she was appointed physician-in-charge of the mechano-therapeutic department of Charing Cross Hospital and assistant physician in similar departments at St. Mary's Hospital and the Royal Free Hospital. The intensive experience she gained in these posts led to her appointment as inspector of military massage and electrical services, with the honorary rank of major R.A.M.C.

At the end of the war in 1919 she returned to public-health work as a medical officer of the newly formed Ministry of Health. In this post she inspected the child-welfare and orthopædic services offered by local authorities and this work led her to study the problems of local government. She resigned her post at the Ministry in 1921 and the following year was elected an alderman of the London County Council. Of her work at County Hall A. D. writes:

I first met Dr. Barrie Lambert, as she then was, in 1919 when, as a medical officer of the Ministry of Health, she inspected the child-welfare clinics of the provincial town where I was medical officer of health. I was greatly impressed by her technical knowledge and her attention to detail. It was ten years before we met again. She was then the chairman of the public-health committee of the London County Council and she recommended to the council my appointment as principal medical officer.

I was unused to having a chairman in constant attendance in a room adjoining my own, but I soon realised the benefits of being able to consult the chairman at any hour of the day when questions of policy likely to lead to political controversy arose. But she never interfered with the running of the department or attempted to interfere with the drafting of a report.

There were many political battles in the early days of the L.C.C. hospital service, but it was mostly shadow boxing. Both political parties were keen to improve the hospitals. The Opposition which until 1934 was the Socialist Party and after that the Municipal Reformers, as the Conservatives were called, would press for greater speed in hospital development and the Majority Party would explain why this was impossible and point out the considerable, often remarkable, progress which had, in fact, been made.

Dame Barrie was indefatigable in her visits to hospitals. She had a tenacious memory and was an excellent debater. She was a firm supporter in time of trouble and tough when she felt that she was right. She was no political partisan and was prepared to fight within her own party to get more money for the hospitals. She was generally successful. She had vision and insight: these combined with her toughness enabled her to overcome obstacles. Few Londoners realise

how much they owe to her for the wholehearted energy with which she attacked the enormous problem of transforming the poor-law hospitals of London into a coordinated hospital system providing a first-rate service for the public.

Dr. Lambert had been appointed C.B.E. in 1920, and in 1938 she was promoted D.B.E. After the National Health Service was started she became a member of the South-East Metropolitan Regional Hospital Board and was chairman of its nursing committee. She died at her home at Tunbridge Wells on Dec. 11 at the age of 86.

WALTER GILMOUR
C.B.E., M.D. Glasg., F.R.A.C.P., D.P.H.

Dr. Walter Gilmour, who died in Auckland on Nov. 16 at the age of 71, was for many years pathologist and chief of laboratory services in Auckland.

He graduated M.B. from Glasgow University in 1908, and after holding posts as assistant to the professor of pathology there and as pathologist at Gartloch Mental Hospital he took the M.D. with first-class honours in 1912. He was in practice in Hamilton before he joined the R.A.M.C. in 1915. During the war he served in Italy, Salonika, and Malta. In 1920 he went to New Zealand to take up his appointment at Auckland. Under his direction the laboratory services developed greatly in volume and range. He himself remained a general pathologist, with particular interest in morbid anatomy and the work of the British Empire Cancer Campaign. He also did a great deal of medicolegal work, and gave evidence in several notable murder trials. He acted for some years as pathologist to the zoo and helped in the care of the animals. He played a considerable part in the foundation of the branch medical faculty in Auckland, looking after the final-year students as its subdean, and he was an examiner in pathology and bacteriology for the University of Otago over a number of years. He retired from his appointment in 1947 but continued to practise as a consultant. He was elected F.R.A.C.P. in 1947 and also appointed C.B.E.

D. R. writes:

As the first trained pathologist to come to Auckland, Walter Gilmour quietly made a substantial mark not only in his own field but in the general medical life of the community. He was a somewhat reticent Scot, but his natural good humour and good companionship came more to the surface as the years went by. His work was meticulous and thorough, and his opinions well thought out. He was a central figure in the medical life of Auckland for twenty-five years, and after that his old and new associates sought him out for professional opinions and for the sake of his company. His two older sons were killed in the late war, and he is survived by his second wife and third son.

JOSEPH EARLE MOORE
B.A. Kansas, M.D. Johns Hopkins

Dr. Earle Moore's department at the Johns Hopkins Hospital in Baltimore was famous throughout the world, for he was a pioneer in the control of the venereal diseases. He had welcomed many doctors from this country to his laboratory as research workers and to home as his friends. Others who had not visited him at the Johns Hopkins had learned something of the breadth of his ideas and of his flavour as a teacher from the Malcolm Morris lecture which he gave in London in 1950.

He was born in Philadelphia in 1892 and graduated B.A. from the University of Kansas in 1914. Two years later he graduated in medicine from the Johns Hopkins University, and after service in France in the Medical Corps of the American Expeditionary, he returned to spend the rest of his working life there. He was a general physician but his special interest was venereal diseases, and his research work and writings in this specialty drew postgraduate students from many continents to the Johns Hopkins. His textbooks, *The Modern Treatment of Syphilis* and *Penicillin in Syphilis* (1947), were widely read, and he was also editor of the *American Journal of Syphilis, Gonorrhœa and Venereal Diseases* and, when it ceased publication, of the *Journal of Chronic Diseases*. During the late war Dr. Moore was adviser on veneral diseases control to the surgeons general of the United States Armed Forces and Public Health Service and chairman of the appropriate subcommittee of the National Research Council. For his guidance and counsel he was awarded the Medal of Merit of the United States in 1946. He died on Dec. 6 in the Johns Hopkins Hospital where he had spent so much of his life.

A. D. writes:

Dr. Earle Moore was highly esteemed on both sides of the Atlantic. He was probably the best-known venereologist of his generation but he was also a general physician with an extensive private practice. His recent appointment as a full professor of medicine at Johns Hopkins Hospital is an indication of the wide range of his skills. Latterly he took a great interest in the administration of his hospital and was chairman of many of its committees. He visited England nearly every year and three years ago he taught at Guy's under their exchange system with Johns Hopkins. He always had one or two research fellows from England working in his department.

His greatest pleasure was in the entertainment of his friends either in London or in his beautiful home in Baltimore. It has happened to me, as to others, to find on our arrival in Baltimore Earle waiting at the station in his Cadillac to tell us that the hotel reservation had been cancelled and that we must be his house guests. A wide circle of friends will feel that Baltimore can never be the same without Earle's welcoming presence.

MARGARET HELEN WHITE
M.D. Edin.

Dr. White, who died at Bromley Hospital on Dec. 10, qualified as Margaret Gordon from Edinburgh University in 1923. In 1924 she took the L.M. Dubl. and two years later the M.D. Before her marriage she was medical officer to McVitie and Price at Harlesden. During the late war, like so many other married medical women, she took up her professional work again and was for a time senior medical officer at the women's hospital at Woolwich Arsenal. A colleague writes:

Dr. White's health had been indifferent for many years; but with her health she was not in the least preoccupied. Her friends will remember her as brave, shrewd, and humorous, absorbed with the life around her, ever kindly and ever willing to help those in need.

Dr. White is survived by her husband, Dr. A. C. White, who is pharmacologist to the Wellcome Research Laboratories at Beckenham.

Appointments

BOLTON-CARTER, J. F., M.CHIR. Cantab., F.R.C.S., M.R.C.P.: part-time consultant general surgeon, Leicester area hospitals.

O'BRIEN, D. J., M.D. Lond.: consultant group pathologist, Croydon group of hospitals.

ORE, SHEILA M., M.B. St. And., D.P.H.: assistant M.O. (school health), Perth and Kinross.

PATTON, W. H. G., M.CH. (ORTH.) Lpool: assistant orthopædic surgeon, Bretby Hall Orthopædic Hospital and associated clinics.

The Hospital for Sick Children, Great Ormond Street, London:

CAMERON, G. S., M.D., B.SC., F.R.C.S.(C): house-surgeon.

DORMANDY, KATHARINE M., M.B. Lond., M.R.C.P.: registrar in clinical pathology.

SCOPES, J. W., M.B. Lond.: house-physician.

SMITH, J. G., M.B. Sydney: house-surgeon.

UTIAN, H. L., M.B.: house-physician.

Colonial Appointments:

BEAUBRUN, M. H., M.B. Edin., D.P.M.: M.O. (psychiatry) (grade A), Mental Hospital, Trinidad.

CHARLES, E. D. B., M.D., L.M.S. Nova Scotia, M.P.H.: epidemiologist, Jamaica.

COMTY, J. H., M.B. Lond., D.M.R.D.: specialist in radiology, health department, Mauritius.

MAGNUS, W. E., M.D., D.M.R.D.: radiologist, Jamaica.

RIGBY, E. P., M.B.E., M.B. Lond., D.T.M.& H.: D.D.M.S., Kenya.

ROWLANDS, T. I., M.B.: M.O., South Pacific Health Service, British Solomon Islands Protectorate.

TOMLINSON, C. H., M.B. Edin., D.M.R.: senior radiologist, Jamaica.

Notes and News

KING EDWARD'S HOSPITAL FUND FOR LONDON

AT a meeting of the general council on Dec. 11, the Duke of GLOUCESTER, president of the Fund, said that of the second allocation of £250,000 for mental hospitals, a major grant had been set aside for a social centre at Warley Hospital in Essex. The latest of the Fund's homes for the aged sick was now functioning very well in connection with St. Benedict's Hospital, Tooting, and another (the twelfth in the series) was to be built at St. Leonard's Hospital in Shoreditch.

Lord MCCORQUODALE, chairman of the management committee, presenting the estimates for 1958, said that £100,000 had been allocated to the distribution committee for general hospitals. Out of this, £25,000 was earmarked for hospital kitchens and catering facilities. In addition £40,000 was reserved for the last of the Fund's twelve homes for the aged sick, and £25,000 for grants to convalescent homes. At the Hospital Administrative Staff College, the national training scheme instituted by the Ministry of Health was going well.

Sir ARCHIBALD GRAY, chairman of the distribution committee, said that over 40% of the committee's allocation had been given to independent hospitals and institutions. A grant of £10,000 had been made to the British Student Tuberculosis Foundation. The Foundation had been started entirely by university students, who since 1950 had collected something like £35,000 to help other students suffering from pulmonary tuberculosis to be under treatment and to continue their academic education at the same time. Up to the present, accommodation had been in two centres outside London, where it was difficult for the tutors to travel from the various colleges. Mottingham Hall, in the grounds of Grove Park Hospital, Lewisham, was now to be converted into a hostel taking about thirty-five ambulant cases, and there would be two wards in Grove Park Hospital for those who had to be admitted to hospital. The students would thus get much better accommodation, with a resident warden, and within easy reach of the various colleges of London University.

Sir HENRY TIDY, chairman of the convalescent homes committee, said that, owing to the improved treatment of heart cases, there was an increasing demand for convalescence for patients who could not manage stairs. Very few convalescent homes had sufficient rooms on the ground-floor, and they were faced with building additional rooms or putting in lifts, which was an expensive matter. Also more convalescent accommodation was needed for patients severely handicapped by war injuries, for paralytics and spastics.

CONFERENCE ON ASTHMA

AT the second International Conference on Asthmology, organised by the International Association for Asthmology, in Lisbon on Oct. 3–6, the following propositions were adopted:

1. That it is necessary to instruct the public in the factors which favour the development of asthma, and to inform it of the medical, social, and domestic means of combating these factors.

2. That it is necessary to set up, in the medical schools, courses on asthmology, aiming to give future practitioners a modern scientific outlook on the prophylaxis, diagnosis, and treatment of asthma.

3. That it is necessary to promote the creation of specialised wards, dispensaries, and research centres.

4. That it is necessary to create in the National Health Service an organisation for special aid to asthmatics.

5. That, since some occupations "often act as an important asthmogenic factor," the responsible authorities should consider legislation to protect the health of the workers and to safeguard the rights of those who have become incapacitated because of occupational asthma.

University of Cambridge

Dr. H. F. Grundy has been appointed a lecturer in the department of pharmacology.

The Raymond Horton-Smith prize has been awarded to Dr. T. S. L. Beswick, Trinity Hall.

University of London

The title of professor of pathology has been conferred on Dr. M. H. Ashton, in respect of his post at the Institute of Ophthalmology.

At recent examinations the following were successful:

D.P.M.—A. J. Coppen, I. P. James, Naomi Ingrid Penfold.

University of Manchester

At recent examinations the following were successful:

M.B., Ch.B.—Patricia M. Addison, Christine E. Atherley, G. R. C. Atherley, A. G. Bailey, Shirley A. Batten, J. M. Beazley, J. C. B. Bennett, Barbara J. Burbridge, Leo Caprio, J. M. Chadwick, Sheila M. Clegg, Winifred E. Dawson, T. G. Egan, Gordon Evison, D. I. Farquhar, Margaret A. Griffiths, P. G. Hickson, H. A. Hope, D. W. Laurie, D. M. Mackinnon, John Mason, W. H. Mellor, Babette M. J. Moorat, J. P. Mumford, Stella M. Parrack, I. C. Ramsay, Thomas Riley, B. A. Snowdon, T. C. Stevenson, Marjorie P. Thomas, L. A. Turnberg, R. L. Walker, Joan Wilkinson, G. M. Wood, J. S. Wootliff.

University of Edinburgh

On Dec. 15 the following degrees and diplomas were conferred:

M.D.—G. L. Alexander, R. S. M. D. Inch, W. T. Jones, J. G. Parish, *G. I. Robertson, *G. F. M. Russell, †A. A. Sharp, Randal Stalker, *A. L. Wallis.

† Gold medal for thesis. * Commended for thesis.

Ph.D. (in the faculty of medicine).—A. I. Klopper.

M.B., Ch.B.—St. Cl. G. Barr, I. S. Begg, C. P. L. Bruggen, E. S. Cullen, Ruth Ferguson, Pierre Flor-Henry, O. D. George, W. J. Glass, K. D. Halpin, W. T. Hunter, J. D. Johnston, Katherine M. Lévy, Raymond Lévy, Stanley Livingstone, James McAnulty, J. C. MacIntosh, I. H. L. Murray, I. H. M. Nicolson, Jean F. Orr, G. D. Porter, Margaret B. Ross, T. G. G. Scott, S. M. F. V. Telfer, C. W. Thomas, W. H. Wallace, Jane M. Watt.

D.P.H.—J. S. Batt, Helen M. Dean.

D.M.R.D.—H. C. Anton, G. J. Green, J. T. Wright.

A graduate travelling scholarship was awarded to F. J. Fish, and the Llewellyn Bevan prize to M. E. S. Harrison.

University of Aberdeen

On Dec. 12 the following degrees were conferred:

M.D.—Donald Emslie-Smith, with honours; C. I. Phillips, A. J. Taylor, with commendation; A. M. Semmence, Donald Sinclair-Smith.

M.B., Ch.B.—Violet T. Addison, A. C. Denholm, G. R. Harvais, J. R. Miller, D. W. Rothnie.

University of Dublin

On Dec. 11 the following degrees were conferred:

M.D.—A. D. H. Browne.

M.B., B.Ch., B.A.O.—Mary K. Bayne, Samuel Bernstein, J. K. Browne, Deirdre B. Crawford, M. J. R. Dawes, J. C. M. Fitzsimon, Shirley A. Fry, J. R. Fullerton, Basil Garofalides, Andrzej Gutkowski, Joyce L. Hill, Irene F. Hurst, G. D. A. Kearney, Panayiotis Petrou Kelalis, A. J. J. Kincaid, G. D. Leather, D. McClure, H. I. Morgan, J. E. E. Morgan, C. R. Pentycross, Danuta Polak, L. A. Ruben, G. J. F. Shepherd, R. D. Stevenson, Kwami Nyaho Tamaklo, Margaret I. Thompson, Ann Walsh.

Royal College of Physicians of London

On Thursday, Jan. 9, Dr. M. S. Thomson will give the Watson Smith lecture on some aspects of industrial dermatitis. On Tuesday and Thursday, Jan. 14 and 16, Dr. Aubrey Leatham will give the Goulstonian lectures. He will speak on auscultation of the heart. All three lectures will be given at the college, Pall Mall East, S.W.1, at 5 P.M.

Royal College of Surgeons of England

AT a meeting of the council on Dec. 12, with Sir James Paterson Ross, the president, in the chair, Lord Webb-Johnson, past president, was elected an honorary fellow in the faculty of anæsthetists and an honorary fellow in the faculty of dental surgery.

The following lecturers for 1958 were appointed: Sir Archibald McIndoe (Bradshaw), Mr. Norman Capener (Robert Jones), Sir John McNee (Thomas Vicary), Prof. H. G. Radden (Charles Tomes).

The Begley prize was presented to P. A. Evans, of King's College Hospital Medical School.

Diplomas of fellowship were granted to the following:

P. L. Berger, N. E. Winstone, Jit Shirmukh Mehta, Pamela M. Bacon, Neil MacDonald, J. S. Lowry, T. R. Beatson, A. N. Cowan, D. J. C. Graff, A. H. Tooley, W. M. Huse, Rustom Jamshedji Jagose, Daryao Singh, I. R. Stillman, J. R. Boulle, Rajiba Bindu Chattopadhyay, E. G. Brewin, R. N. McCann, L. P. Kiriella, H. L. Lusby, B. K. Shenolikar, P. M. Yeoman, Vikram Marwah, H. J. Tighe, Hanus Weisl, W. G. T. Bell, A. G. Horsburgh, K. J. Millar, J. E. Reimer, Achyutananda Sinha, M. D. M. Staunton, N. J. Blacklock, M. A. Browne, B. J. Ireland, Chelliah Kathirkamanathan, Solomon Levitt, J. P. Lythgoe, J. H. Phillips, Kizhakanchery Subramaniam Subramaniam, Shivkumar Maganlal Bhatt, W. J. Burfitt-Williams, J. T. Dunn, J. Fairgrieve, M. H. Gough, L. R. H. Gracey, R. L. Gupta, C. A. Holborow, Leslie Klenerman, K. W. Mills, J. G. Power, S. C. Simmons, A. R. Trist, R. D. Weeks, John Winstanley, A. G. Amias, R. C. Baillie, J. McN. Beith, B. R. A. Binnewald, Syed Ali Raza Gardezi, A. N. Griffith, H. M. Hadley, T. M. Hannigan, Irene M. Irving, George Lautré, Kailash Chandra Mittal, J. W. Monaro, Marakada Yathin-Rai, W. H. Raynham, J. B. M. Roberts, H. B. Ross, J. H. Steyn, E. C. Watson, Yogendra Nath Agrawal, J. M. Bremner, C. G. Clark, H. V. Crock, P. A. Harbison, J. D. Hughes, R. G. Kay, Thomas King, Sandip Mukerjee, Anilkumar Shantilal Parikh, Robert Tym, D. B. M. Williams, A. S. Cass, A. D'A. Pelly, P. M. Segelov.

University of Western Australia

The following appointments have been announced:

Dr. R. B. Lefroy, assistant to the professor of medicine; Mr. J. G. Brockis, senior assistant to the professor of surgery and assistant surgeon, Royal Perth Hospital; Dr. K. E. Mortimer, senior lecturer in anatomy; Dr. J. H. Little, senior lecturer in pathology.

Royal College of Surgeons of Edinburgh

At a meeting of the college on Dec. 11, with Prof. John Bruce, the president, in the chair, the following were admitted fellows:

Doreen A. Birch, Nilmadhab Bose, A. S. Cass, L. R. Celestin, San Thau Cheong, C. P. Cotterill, Hermanus van Zyl De Klerk, W. R. Dunlop, H. J. Du Toit, C. R. Fenton, A. P. Fuller, Syed Ali Raza Gardezi, J. O. Gardiner, Samy Wassif Ghali, Hari Datta Goyle, Prem Begraj Gupta, D. O. Hancock, C. A. Hobbs, A. H. T. Hodgkinson, Farouk Ahmed Hosni, T. W. N. Irwin, Inder Sen Jain, Girdhari Lal Koula, Kazimierz Kuczynski, Subodhchandra Mohanlal Ladhawala, Hari Choithram Mansharamani, R. H. Martin, Konthath Achutha Menon, Ram Piari Mittal, Sandip Mukerjee, D. J. O'Shaughnessy, J. H. Phillips, G. D. Pinker, H. M. Pringle, Marakada Yathindranath Rai, Ghulam Rasul, Ajit Kumar Ray, J. E. Reimer, Donald Solomons, D. E. M. Taylor, Ng Nen Ling Teckham, R. V. J. Windsor, Stuart Young.

Royal College of Physicians of Ireland

At a meeting of the college on Dec. 6 the following were admitted licentiates in medicine and midwifery:

Audrey L. Astbury, Carol G. R. Coulter, P. J. Daly, J. G. Deehan, J. A. F. Doherty, J. D. Hayes, Margaret M. Humphreys, Michael Leahy, K. P. Liston, D. M. Lyndsay, J. G. McSparran, M. G. O'Donoghue, D. C. O'Neill, G. I. B. Olusanya, Sewpersadh Panday, Altekin Hussein Riza, Mary P. Russell, Mahomed Ahmed Shaikh, Olawale Soyemi, R. H. M. Townend, A. de L. O'Connor.

British Association of Otolaryngologists

The following have been elected officers of this association for 1957–58;

President, Mr. C. Gill-Carey; immediate past president, Mr. I. Simson Hall; vice-president, Mr. R. R. Simpson; hon. treasurer, Mr. J. C. Hogg; hon. secretary, Mr. Myles L. Formby.

Heberden Society

The general public expects everything of the National Health Service and expects it for practically nothing, said Mr. R. H. M. Thompson, parliamentary secretary of the Ministry of Health, speaking at the Heberden Society's annual dinner on Dec. 13. He had never ceased to marvel at how much people were prepared to spend on their comforts and amenities and how little on the best medical brains that money could buy. Somewhere in the middle the Ministry of Health had got to find an acceptable answer—acceptable both to the medical profession and to the public. He wondered whether Ministers might not win more respect if (like Heberden's patient, Dr. Johnson) they sometimes admitted to "ignorance, Ma'am, pure ignorance." Describing Johnson as a "total imbiber," Mr. Thompson referred to the Heberden oration on gout, delivered earlier in the day by Prof. Brøchner-Mortensen and went on to speak of the enormous disabling effect of rheumatism and the corresponding importance of the work of the society—a body limited to 100 members devoted to "the kind of research that is every year becoming more vital." In conclusion he referred to the Ministry's difficulty in making "everything we want and expect from the medical profession" fit into a financial frame that the public will accept and pay for. Dr. Ernest Fletcher, the president, appreciated the parliamentary secretary's sympathy for the profession, but evidently felt that sympathy is not quite all that will be needed. He described the society's state as excellent, with good attendances, good papers, and good organisation—not to mention that for the second year in succession, one of its members had been raised to the peerage. But there was a feeling among members that, as doctors and investigators, workers on rheumatism had been neglected too long. Their centres of research were as well equipped as those of other specialties; yet they were put out in the cold and denied recognition. They ought to strike, was the presidential advice.

Dr. W. S. C. Copeman proposed The Guests and Sir Henry Dale replied.

Dr. Bernard Myers left 20 guineas to the West London Medico-Chirurgical Society for award to the member who writes the best essay on diverticulosis of the colon.

Births, Marriages, and Deaths

BIRTHS

WATSON.—On Dec. 11, in Port of Spain, Trinidad, to Margaret (née Brocklebank), wife of Mr. H. Preston Watson, F.R.C.S.E. of Tobago, B.W.I.—a daughter.

R.A.F. Appointments

The following appointments have been made in the medical branch of the R.A.F.:

Group-Captain H. H. S. Brown, medical adviser to Director of aircraft mechanical engineering equipment research and development; Group-Captain A. Muir, Air Ministry M.A.9; Wing-Commander R. L. Scott, officer commanding, R.A.F. Hospital, St. Athan.

Oxford Graduates' Medical Club

The winter dinner of this club will be held at the Royal College of Surgeons, Lincoln's Inn Fields, London, W.C.2, on Saturday, Jan. 25, at 7.30 P.M. Sir Alexander Ingleby-Mackenzie will be in the chair. Tickets (27*s.* 6*d.*) may be had before Jan. 21 from Mr. Selwyn Taylor, 3, Roedean-crescent, Roehampton, S.W.15.

ANSWERS TO CHRISTMAS QUIZ

(*See p. 1280*)

1. (*a*) Abernethy; also Oliver of Bath (Bath-Oliver); (*b*) Hans Sloane; (*c*) Thomas Young, who interpreted the Rosetta Stone; also Virchow, who took part in Schliemann's excavations at Troy; (*d*) Marat, who before becoming a revolutionary had a large practice first in London then in Paris; (*e*) Auenbrugger, who wrote *The Chimney Sweep* at the request of Maria Theresa; (*f*) Lettsom; (*g*) Linnæus; (*h*) Hans Sloane, created a baronet 1716.

2. (i) (*a*) John; (*b*) Henry VIII; (*c*) Henry I; (*d*) Mary II; (*e*) Elizabeth I.
(ii) Oliver Cromwell's. By a devious route it reached Dr. Wilkinson, Shortlands, Kent, who bequeathed it to his son, Canon Wilkinson, Woodbridge, Suffolk, who died in 1957.

3. (i) Walter Elliot, Malcolm Macdonald, Ernest Brown, Henry Willink, Aneurin Bevan, Hilary Marquand, Harry Crookshank, Iain Macleod, Robin Turton, Dennis Vosper, Derek Walker-Smith. (ii) Neville Chamberlain, March to August, 1923, November, 1924, to June, 1929; August, 1931, to November, 1931.

4. (*a*) Heroine dies of tuberculosis; (*b*) The Black Death; (*c*) Words written by Anne, wife of John Hunter, music by Haydn; (*d*) Italian dance believed to be a cure for the bite of the tarantula spider, but the name is more probably derived from Taranto, South Italy; (*e*) heroine dies of tuberculosis.

5. (*a*) Both named after places (Tulare, a county in California where the disease was first observed, Derbyshire, where goitre was prevalent); (*b*) all were students at St. Thomas's Hospital; (*c*) all were Quakers; (*d*) all reached their 90th year.

6. (*a*) Jacobus Sylvius (1478–1555), teacher of Vesalius whom he held in contempt: Franciscus Sylvius (1614–1672) discovered the Sylvian fissure; (*b*) Edward Jenner of vaccination fame; Sir William Jenner, 19th-century physician; (*c*) Tormina, colic; Taormina, a town in Sicily.

7. (i) (*a*) tuberculosis; (*b*) influenza (name given in Paris, 1803, because believed to be due to too thin clothes); (*c*) tuberculosis, name given because believed to be due to excessive indulgence in dancing; (*d*) rickets; (*e*) the Sweating Sickness. (ii) Syphilis, after a character in Fracastorius's poem, *Syphilis, sive morbus Gallicus*, 1530.

8. (*a*) Pasteur (Meister was the first patient to be cured of rabies; (*b*) Hippocrates; (*c*) Cheselden; (*d*) Galen; (*e*) Cheselden; (*f*) Caesar Hawkins and Hans Sloane; (*g*) Edward Jenner (the boy was his guineapig).

9. (*a*) A vegetable remedy; (*b*) boil, ulcer or pimple; (*c*) scab or scurf; (*d*) an antidote to a poison; (*e*) quinine; (*f*) honey and water; (*g*) old form of 'phthisic'; (*h*) honey and vinegar; (*i*) a stone found in the goat's intestine once used as an antidote to a poison.

10. (*a*) Napoleon; (*b*) King Edward VII when Prince of Wales, at a meeting of the founders of the Brompton Hospital (he was protesting against the number of appointments, suspecting jobs for the boys); (*c*) Molière, *Le Médecin malgré-Lui* (to cover his blunder, Sganerel, the mock doctor, explains that the heart is now on the right and the liver on the left; (*d*) G. B. Shaw, *The Doctor's Dilemma*, Act I; (*e*) Voltaire; (*f*) Said of the future Queen Anne by Radcliffe when he was the worse for drink. Had he not thereby forfeited the royal favour some at least of the Queen's numerous miscarriages might not have occurred.

11. (*a*) Than fee the doctor for a nauseous draught (Dryden); (*b*) God is forgotten, and the doctor slighted (Dr. John Owen, died 1622, *Epigrams*); (*c*) That all can be set right with calomel? (W. S. Gilbert, *Patience*).

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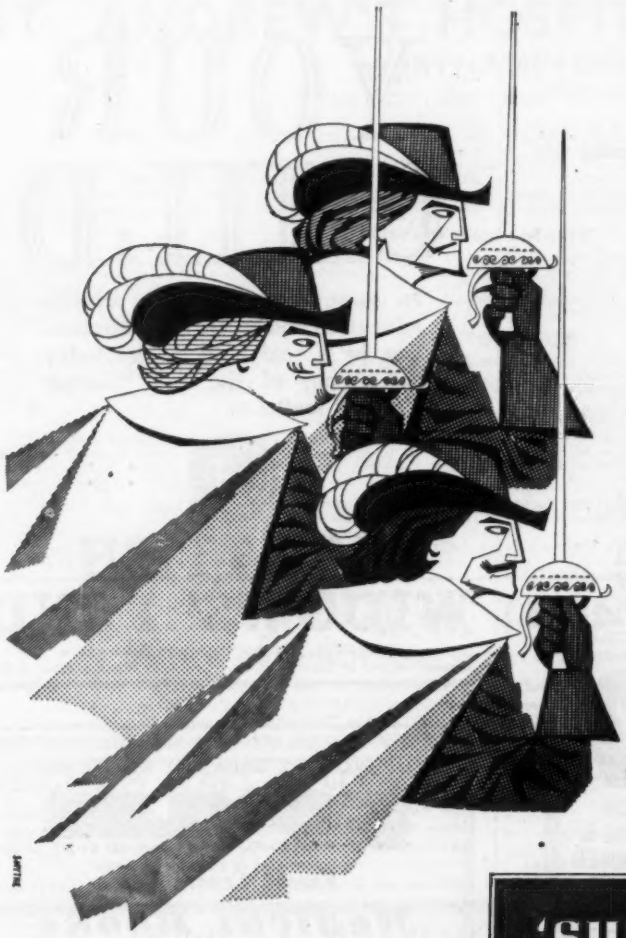

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Beverley. Westwood. H.O. or Sr. H.O. 30
Birmingham. Solihull. Sr. H.O. & Pre-reg. H.O. 30
Bishop Auckland Gen. H.O. .. 30
Carluke, Lanarkshire. Law. Sr. H.O. 31
Carshalton. St. Helier. Sr. Reg. & Pre-reg. H.O.'s 31
Chertsey. St. Peter's. Sr. Reg. & Reg. 31
Colchester Group H.M.C. H.O.'s .. 32
Dewsbury. Gen. Pre-reg. H.O. .. 32
Dudley, Stourbridge & Dist. Sr. H.O. & Pre-reg. H.O.'s 32
Leeds United Hosps. Reg. 33
Leigh (Lancs) Infy. Pre-reg. H.O. .. 33
Llanelly. Jr. H.M.O. 33
Maidstone. West Kent Gen. Pre-reg. H.O. 33
Newcastle R.H.B. & United Hosps. Sr. Reg. 34
Norwich. Norfolk & Norwich. Pre-reg. H.O.'s 34
Portsmouth Group H.M.C. Sr. H.O.'s & Pre-reg. H.O.'s 35
Rochdale & Dist. H.M.C. H.O.'s .. 35
Ryde. Royal I.W. County. Pre-reg. H.O. 35
Salisbury Gen. H.O. 35
Scunthorpe War Mem. Pre-reg. H.O. or Sr. H.O. 35
Sheffield R.H.B. P.-t. Cons. 28
Shrewsbury. Royal Salop Infy./Copthorne. H.O. 36
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Wolverhampton. Royal. Pre-reg. H.O.'s 37
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Birmingham United Hosps. H.O. .. 30
Bolton Dist. Gen. H.O. 31
Colchester Group H.M.C. H.O. .. 32
Doncaster. Western. Sr. H.O. or Pre-reg. H.O. 32
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Epsom Dist. Pre-reg. H.O. 32
Hastings. Buchanan. Sr. H.O. .. 33
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Leamington Spa. Warneford Gen. H.O. 33
Newcastle R.H.B. Reg. 34
Norwich. Norfolk & Norwich. Pre-reg. H.O. 34
Pontypridd, East Glamorgan. Sr. H.O. 35
South East Met. R.H.B. Reg. .. 36
Sunderland Infy. H.O. or Sr. H.O. 36
B.W.I. University College Hosp. Sr. Reg. or Reg. 38

OPHTHALMOLOGY
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Maidstone. Kent County Ophthalmic & Aural. Sr. H.O. 33
Manchester United Hosps. Sr. H.M.O. 28
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Bournemouth. Royal Victoria. Sr. H.O. 31
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Newcastle R.H.B. Reg. 34
Norwich. Norfolk & Norwich. Pre-reg. H.O. 34
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Southend-on-Sea. Gen. Sr. H.O. .. 36
Tunbridge Wells. Pembury. Sr. H.O. 37
Watford. Peace Memorial. Sr. H.O. or H.O. 37

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Westminster, S.W.1. Reg. 30
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Birmingham R.H.B. Reg. 30
Bolton & Dist. H.M.C. Sr. H.O. .. 31
Coventry & Warwickshire. Jr. H.M.O. 32
Newcastle R.H.B. Reg. 34
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Rochdale & Dist. H.M.C. Sr. H.O. .. 35
Sheffield. City Gen. Sr. H.O. .. 36
Wallasey. Victoria Central. Sr. H.O. 37

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Cardiff United Hosps. Sr. Reg. or Reg. 31

PLASTIC SURGERY
East Grinstead. Queen Victoria. H.O. 32

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Crowthorne. Broadmoor Institution. Sr. Reg. 32
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Wanstead, E.11. H.O. 30
Altrincham Gen. Sr. H.O. 30
Barnstaple. North Devon Infy. H.O. 30
Bedford Gen. H.O. 30
Birmingham. Solihull. Pre-reg. H.O. 30
Birmingham United Hosps. Reg. .. 30
Blackburn & Dist. H.M.C. H.O.'s .. 31
Brighton Gen. H.O. 31
Brighton. Royal Alexandra Hosp. for Sick Child. H.O. 31
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Norwich. Norfolk & Norwich. Pre-reg. H.O.'s 34
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Portsmouth Group H.M.C. Sr. H.O. & Pre-reg. H.O.'s 35
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Sheffield. Wharncliffe. Reg. 36
Shoreham-by-Sea. Southlands. H.O.'s & Locum H.O. 36
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Tredegar Gen. Sr. H.O. or Jr. H.M.O. 37
Watford. Peace Memorial. Pre-reg. H.O. 37
Weston-super-Mare Gen. Pre-reg. H.O. 37
Wigan & Leigh H.M.C. Pre-reg. H.O. 37
Wigan & Leigh H.M.C. Sr. H.O. .. 37
Windsor. King Edward VII. Pre-reg. H.O. 37
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The terms and Conditions of Service of Hospital Medical and Dental Staff apply to all N.H.S. hospital posts we advertise, unless otherwise stated. Canvassing disqualifies, but candidates may normally visit the hospital by appointment.

Academic and Educational

FACULTY OF ANÆSTHETISTS
ROYAL COLLEGE OF SURGEONS OF ENGLAND

BOARD OF FACULTY ELECTION

NOTICE is hereby given that an election of 1 Fellow of the Faculty to the vacancy on the Board will take place on WEDNESDAY, 12TH MARCH, 1958, at 2.30 P.M. The following shall be eligible for election to the Board on complying with the conditions of the Regulations :—

(*a*) All Fellows of the Faculty by election, provided they have been medically qualified for 20 years.

(*b*) All Fellows who have been medically qualified for 20 years and a Fellow by examination for 10 years.

Application forms of the requisite notice to be signed by the candidate and his nominees may be obtained on application to me, and must be received by me, duly completed, by 2nd January, 1958.

The names of the candidates will be published in the London Gazette and the Medical Journals on or about Wednesday, 22nd January, 1958. A voting paper will be sent by post to each Fellow whose address is registered at the College on Wednesday, 22nd January, 1958. Fellows are requested to give notice, without delay, of any change of address, so that their voting papers may not be misdirected. W. F. DAVIS, Secretary.

Lincoln's Inn-fields, London, W.C.2.

UNIVERSITY OF EDINBURGH

CHAIR OF DENTAL SURGERY

The University Court invites applications for the Chair of Dental Surgery which will fall vacant at 30TH SEPTEMBER, 1958, through the retirement of Professor A. C. W. HUTCHINSON.

The terms and conditions of appointment may be obtained from the undersigned, with whom applications (12 copies), giving the names of 2 referees and including any testimonials or evidence candidates may wish to offer, should be lodged not later than 22nd February, 1958. A candidate from overseas may submit 1 copy of his application.

CHARLES H. STEWART, Secretary to the University.

Old College, South Bridge, Edinburgh, December, 1957.

UNIVERSITY OF GLASGOW and ROYAL FACULTY OF PHYSICIANS AND SURGEONS

CONFERENCES ON OBSTETRICS AND GYNÆCOLOGY

A series of conferences on obstetrical and gynæcological subjects will be held as detailed below. These conferences are arranged for members of hospital medical staffs and interested practitioners. The conferences will be held within the Hall of the Royal Faculty, 242, St. Vincent-street, Glasgow, from 3 P.M. to 5 P.M. on the undernoted dates.

There is no fee for attendance.

Date	*Subject*	*Speakers*
Thursday, 9th Jan., 1958	"Imminent Eclampsia"	Chairman: Prof. I. DONALD Openers: Dr. R. A. TENNENT Dr. J. S. BARR
Thursday, 13th Feb., 1958	"Operative Treatment of Prolapse"	Chairman: Dr. J. HEWITT Openers: Dr. H. STIRLING Dr. W. C. ARMSTRONG
Thursday, 13th March, 1958	"Post-maturity"	Chairman: Dr. D. MCKAY HART Openers: Dr. R. DE SOLDENHOFF Dr. A. D. T. GOVAN
Thursday, 10th April, 1958	"Treatment of Carcinoma of the Cervix"	Chairman: Dr. H. R. MACLENNAN Openers: Dr. M. A. C. COWELL Mr. J. T. MAIR
Thursday, 8th May, 1958	"Cardiac Disease in Pregnancy"	Chairman: Dr. J. BRUCE DEWAR Openers: Mr. R. S. BARCLAY Dr. M. D. BLACK
Thursday, 12th June, 1958	"Amenorrhœa"	Chairman: Prof. D. F. ANDERSON Openers: Dr. A. M. SUTHERLAND Dr. E. G. OASTLER

For further details apply to the Registrar, Royal Faculty of Physicians and Surgeons, 242, St. Vincent-street, Glasgow, C.2.

INSTITUTE OF ORTHOPÆDICS

PROVISIONAL PROGRAMME

A COURSE OF LECTURES on "Disorders of the Spine" will be given in the Lecture Room at the Institute of Orthopædics, Royal National Orthopædic Hospital, 234, Great Portland-street, London, W.1, on FRIDAYS at 6 P.M. on the following dates :—

17th Jan.	Scoliosis I	Mr. J. I. P. JAMES
31st Jan.	Scoliosis II	Mr. J. I. P. JAMES
7th Feb.	Spondylolisthesis	Mr. P. H. NEWMAN
14th Feb.	Ankylosing Spondylitis	Mr. D. TREVOR
21st Feb.	Infections of the Spine other than Tuberculosis	Mr. C. W. MANNING
28th Feb.	Disc Lesions	Mr. P. H. NEWMAN
7th March	Osteoporosis of the Spine	Dr. R. NASSIM
14th March	Tumours of the Spine	Mr. H. J. BURROWS
21st March	Pott's Disease	Mr. J. A. CHOLMELEY
28th March	Pott's Paraplegia	Mr. H. J. SEDDON

The fee for the full course will be 3 guineas, or for a single lecture 7s. 6d.

Tickets may be obtained on application to the Dean, at 234, Great Portland-street.

UNIVERSITY OF CAMBRIDGE. The Appointments Committee of the Faculty of Biology 'B' in the University of Cambridge intend to appoint a UNIVERSITY LECTURER in the Department of Pathology to hold office from 1st October, 1958. Candidates should have had previous experience in the field of virology. The appointment will be subject to the statutes and ordinances of the University.

Details of the post may be obtained from Dr. G. F. ROBERTS, Department of Pathology, Tennis Court-road, Cambridge, to whom candidates should send 10 copies of their applications, together with the names of not more than 3 referees, by 13th February, 1958.

MIDDLESEX COUNTY COUNCIL EDUCATION COMMITTEE
BRUNEL COLLEGE OF TECHNOLOGY,
Woodlands-avenue, Acton, W.3
DEPARTMENT OF CHEMISTRY

CHROMATOGRAPHY IN CLINICAL AND AGRICULTURAL BIOCHEMISTRY

Short 4-day FULL-TIME LABORATORY COURSE commencing 31ST DECEMBER, 1957, for chemists and biochemists and others engaged in clinical or agricultural chemistry or associated work. Fee £4.

Lecturer: I. SMITH, B.SC., PH.D., F.R.I.C. (Courtauld Institute of Biochemistry).

C. E. GURR, M.SC., PH.D.,
Secretary to the Education Committee.

UNIVERSITY OF TORONTO

FELLOWSHIPS IN MEDICAL RESEARCH AND IN PREVENTIVE MEDICINE

The Col. Sir Albert Gooderham Memorial Fellowship in the Connaught Medical Research Laboratories, University of Toronto.

The Fitzgerald Memorial Fellowship in the School of Hygiene, University of Toronto.

Available to graduates in Medicine or Science—stipends up to $5000 p.a.

For information write to the Director, Connaught Medical Research Laboratories, or the Director, School of Hygiene, University of Toronto.

UNIVERSITY OF OXFORD. Applications are invited for a post of GRADUATE ASSISTANT in the Department of Pathology. The successful candidate will be attached to the morbid anatomy laboratory and will have special responsibility for the museum and the arrangement of demonstrations, &c., in connection with the teaching programme; there will also be opportunities for research. The appointment will be for 1 year in the first instance and preference will be given to candidates with previous experience in pathology. Salary in the range of £900–£50–£1600 according to previous experience and qualifications.

Applications, with the names of 3 referees, should be sent not later than 4th January, 1958, to Dr. A. H. T. ROBB-SMITH, Department of Pathology, Radcliffe Infirmary, Oxford, from whom further particulars may be obtained.

UNIVERSITY COLLEGE, Ibadan, Nigeria. Faculty OF MEDICINE. Applications are invited for SENIOR LECTURESHIP IN OPHTHALMOLOGY. Appointment as soon as possible, for 3 years in first instance. Salary scale: £1850–£100–£2450 p.a. Appointee would be offered honorary consultant appointment by Board of Management of University College Hospital. Allowance for up to 3 children, £50 p.a. per child resident in Nigeria, £100 p.a. per child resident elsewhere. Part furnished accommodation at rent not exceeding 7·7 % of salary. Passages for appointee, wife and up to 3 children below age of 11 years on appointment, overseas leave and termination. F.S.S.U. Outfit allowance £60.

Detailed applications (10 copies), naming 3 referees, by 13th January, 1958, to Secretary, Senate Committee on Colleges Overseas in Special Relation, University of London, Senate House, London, W.C.1, from whom further particulars may be obtained.

UNIVERSITY OF MALAYA, Singapore. Applications are invited for the following posts :—

(*a*) LECTURESHIP or ASSISTANT LECTURESHIP IN ANATOMY.

(*b*) ASSISTANT LECTURESHIP IN BACTERIOLOGY.

For (*a*) experience in teaching histology, embryology, neurology and gross anatomy essential.

Salary scales: for medically qualified persons—Lecturer £1295–£49–£1442/1540–£56–£1988 p.a., Assistant Lecturer £1148–£49–£1246 p.a. For others—Lecturer £1148–£49–£1442/1540–£56–£1820 p.a., Assistant Lecturer £1001–£49–£1099 p.a. Entry point according to qualifications and experience. Allowances: expatriation in range £280–£308 p.a., cost of living in range £210–£560 p.a. All paid in Malayan currency. Free passages for appointee, wife and children under 12 years. Part-furnished quarters at reasonable rent. Provident fund scheme.

Detailed applications (6 copies), naming 3 referees, by 10th January, 1958, to Secretary, Inter-University Council for Higher Education Overseas, 29, Woburn-square, London, W.C.1, from whom further particulars may be obtained.

UNIVERSITY COLLEGE OF THE WEST INDIES. Applications are invited for appointment to the CHAIR OF SURGERY. The Professor will be head of the Department of Surgery and will be responsible for teaching medical students for degrees of University of London and for development of research. He will also be in charge of surgical beds in the University College Hospital. Duties to be assumed as soon as can be arranged. Salary in range £2400–£2750 p.a. Entry point determined by qualifications and experience. Child and other allowances paid. F.S.S.U. Unfurnished accommodation at rent 5 % basic salary. Passages for up to 5 persons on appointment, normal termination and study leave (once every 3 years).

Detailed applications (10 copies), and naming 3 referees, by 20th January, 1958, to Secretary, Senate Committee on Colleges Overseas in Special Relation, University of London, Senate House, London, W.C.1, from whom further particulars may be obtained.

Hospital Services: Senior Appointments

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.1. Applications are invited for the vacancy of Tumour Research PATHOLOGIST for a period of 1 year in the first instance. The work involves experimental pathology. Salary in accordance with Senior Hospital Medical Officer scale.

Further particulars and forms of application, which should be returned by 6th January, 1958, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

GUY'S HOSPITAL. The Board of Governors invites applications for the appointment of an ASSISTANT SURGEON in the Genito-Urinary Department to fill a vacancy which will occur in July, 1958. The appointment is of consultant status and 4 attendances will be required per week. The conditions of service will be in accordance with the terms and conditions of service of hospital medical staff.

Applications (1 copy), together with the names of 3 referees, should be lodged with the Superintendent, Guy's Hospital, London Bridge, S.E.1, not later than 20th January, 1958. In accordance with Statutory Instrument No. 1259 of the National Health Service regulations, canvassing members of the Board or Advisory Appointments Committee will lead to disqualification.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited for the appointment of PSYCHOLOGIST (whole-time) at The National Hospital, Queen-square, W.C.1. Experience in psychometric methods and research interests will be recommendations. The appointment will be for 1 year in the first instance. Salary in accordance with the Ministry of Health scale for Psychologists. Candidates with medical qualifications may apply.

Applications, giving the names of 2 referees, should be sent to the undersigned not later than 3rd January, 1958.

H. EWART MITCHELL, Secretary to the Board of Governors.
The National Hospitals for Nervous Diseases,
Queen-square, London, W.C.1.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time ASSISTANT CHEST PHYSICIAN to the Camberwell Group of hospitals. Duties will be mainly at the Chest Clinic, St. Giles' Hospital, St. Giles-road, Camberwell, S.E.5. Applicants must have had previous experience in chest diseases, and a higher qualification in medicine, a Diploma of Membership of a Royal College of Physicians or a Diploma in Public Health would be an advantage. Salary within the scale £1653 15s.–£2126 10s.–£2126 5s. Applicants may visit the Clinic.

Apply, stating nationality, age, sex, qualifications and experience, including details of present appointment and of war service, together with the names and addresses of 3 referees, to The Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, London, W.1, not later than 11th January, 1958.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as CONSULTANT in General Pathology in all branches to the Woolwich Group of hospitals for duty at any of the hospitals in the group. Choice of whole-time service or part-time service for the maximum of 9 notional half-days will be offered. Candidates must have had wide experience in pathology and a higher University degree or membership of a Royal College of Physicians is desirable. Applicants may visit the hospitals concerned.

Apply, stating nationality, age, sex, qualifications and experience, including details of present appointment and of war service, together with the names and addresses of 3 referees, to The Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, London, W.1, not later than 4th January, 1958.

BIRMINGHAM REGIONAL HOSPITAL BOARD. Whole-time CONSULTANT GERIATRICIAN. Duties mainly at Cross Houses Hospital, Shrewsbury, and peripheral hospitals in Salop area. Higher medical qualification and special interest in Geriatrics required.

Applications (15 copies), stating name, age, qualifications, nationality, present and previous appointments and details of 3 referees, to, Secretary, 10, Augustus-road, Birmingham, 15, by 20th January, 1958.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(*a*) Whole-time CONSULTANT PATHOLOGIST in the Wolverhampton Group. Duties mainly in Royal Hospital, Wolverhampton. Special interest in chemical pathology and higher qualification essential.

(*b*) Whole-time CONSULTANT PATHOLOGIST (hæmatologist). Duties mainly at Selly Oak Hospital, also other hospitals in the group. Wide experience and higher qualification required.

(*c*) Whole-time SENIOR CASUALTY OFFICER, Coventry and Warwickshire Hospital. Salary within the scale £1653–£2126 p.a. Tenable up to 4 years. Higher qualification an advantage.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments, and details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, by 20th January, 1958.

BIRMINGHAM REGIONAL HOSPITAL BOARD. Part-time CONSULTANT RADIOLOGIST (9 notional half-days weekly). Duties at Royal (1 notional half-day) and New Cross (2 notional half-days) Hospitals, Wolverhampton; Hallam (3 notional half-days) and West Bromwich and District General (3 notional half-days) Hospitals, and other group hospitals. Wide experience specialty/higher qualification required.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments, and details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, by 20th January, 1958.

COULSDON, SURREY. CANE HILL HOSPITAL (for nervous and mental disorders). Locum tenens ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) required from early January, 1958, for about 4 months or possibly longer. Remuneration £34 14s. 6d. a week. Residential accommodation available if required for single man or woman.

Applications to Physician-Superintendent.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL, MANCHESTER, 13. SENIOR HOSPITAL MEDICAL OFFICER in Ophthalmology. Full-time, or maximum part-time, non-resident post. Previous experience in specialty essential.

Application form obtainable from F. J. CABLE, Secretary, United Manchester Hospitals, to be returned as soon as possible.

LEEDS REGIONAL HOSPITAL BOARD.

CONSULTANT in Child Psychiatry (whole-time or maximum part-time). Duties at Child Psychiatric Clinics of the County Boroughs of Wakefield (2 sessions per week), Dewsbury (2 sessions per week) and the remainder with the West Riding County Council (at Mirfield, Wakefield, Goole and Todmorden).

CONSULTANT in Psychiatry (whole-time or maximum part-time). Leeds A and B Groups (mainly at St. James's Hospital). A part-time contract would provide for 5 inpatient and 4 outpatient sessions.

Whole-time ASSISTANT PSYCHIATRISTS (Senior Hospital Medical Officer grade) :—

1. Menston Hospital, near Leeds (2500 Beds) and associated general hospitals. Accommodation for single person only.

2. Storthes Hall Hospital (2680 Beds), Kirkburton, near Huddersfield and associated general hospitals. Resident or non-resident. Large modern flat available if required. Accommodation also available for a single person.

3. Clifton Hospital, York (1112 Beds) and associated general hospitals. House available.

Candidates for these Senior Hospital Medical Officer posts should normally hold a D.P.M., but applications will also be considered from candidates without previous experience in psychiatry who hold a higher medical qualification, and have had wide experience in general medicine in the Senior Registrar grade and who intend to obtain a D.P.M. and specialise in psychiatry.

Applications (12 copies), stating age, qualifications, and details of present and previous appointments with dates, and names and addresses of 3 referees, to the Secretary, Park-parade, Harrogate, by 21st January, 1958.

LIVERPOOL REGIONAL HOSPITAL BOARD. Alder HEY CHILDREN'S HOSPITAL. Applications are invited for the post of Part-time CONSULTANT PÆDIATRICIAN for 4 notional half-days per week in the Department of Child Health of the University of Liverpool at the above Hospital. Applicants should have considerable experience and must possess a higher qualification.

Forms of application from Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 19, James-street, Liverpool, 2, to be returned not later than 11th January, 1958.

VINCENT COLLINGE, Secretary to the Board.

LIVERPOOL REGIONAL HOSPITAL BOARD. South LIVERPOOL GROUP. Applications are invited for the post of Whole-time ASSISTANT RADIOLOGIST (Senior Hospital Medical Officer) with duties in the above group but mainly at Sefton General Hospital (816 Beds). Applicants should possess a Diploma in Radiology and have wide experience in radiology.

Forms of application from Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 19, James-street, Liverpool, 2, to be returned not later than 11th January, 1958.

VINCENT COLLINGE, Secretary to the Board.

NEWCASTLE REGIONAL HOSPITAL BOARD. CONSULTANT PSYCHIATRIST in Child Guidance, St. Luke's Hospital, Middlesbrough (567 Beds). The Child Guidance Unit of this Hospital consists of an inpatient unit of 16 beds and an active Outpatient Department. Additional outpatient clinics will be arranged in association with the North Riding local authority. The appointment is whole-time; up to 2 sessions per week may be spent at the Unit of Child Psychiatry, Newcastle, a teaching and research unit associated with the University Department of Psychological Medicine. Opportunities will be given for devoting some time to adult psychiatry. Appointee to reside in close proximity to the Hospital. Further particulars from Regional Psychiatrist.

Applications, with names and addresses of 3 referees, to Regional Psychiatrist, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 28 days.

OXFORD REGIONAL HOSPITAL BOARD. Whole-time ASSISTANT PATHOLOGIST (Senior Hospital Medical Officer grade) to the Reading Area Department of Pathology for duties in the Area Laboratory Service in the hospitals of the Reading and District Hospital Management Committee area. The duties will include work in all the main branches of clinical pathology and candidates should have had a wide general experience.

Applications (12 copies), stating age, qualifications, experience and the names and addresses of 3 referees, should reach the Secretary (from whom further particulars may be obtained), 43, Banbury-road, Oxford, by 21st January.

OXFORD REGIONAL HOSPITAL BOARD. Locum CONSULTANT in Ophthalmology, 4 sessions weekly, Aylesbury area.

Apply immediately, stating age, qualifications, experience and names of 2 referees, to the Secretary, 43, Banbury-road, Oxford.

SHEFFIELD REGIONAL HOSPITAL BOARD. Maximum Part-time CONSULTANT PHYSICIAN required for the Barnsley Group of hospitals.

Application form and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 18th January, 1958.

WELSH REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens CONSULTANT ANÆSTHETIST required St. Lawrence Hospital, Chepstow (122 plastic surgery and 52 orthopædic beds). Appointment for 1 year from 1st July, 1958.

Applications, naming 2 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff.

Hospital Services: Junior Appointments

LONDON JEWISH HOSPITAL, Stepney Green, E.1. (130 Beds.) HOUSE PHYSICIAN (pre- or post-registration) required for 6 months. Post vacant 5th January, 1958.

Applications, stating age, experience, &c., and copies of not more than 3 testimonials, to be sent to the Hospital Secretary not later than 27th December, 1957.

BROOK GENERAL HOSPITAL, Shooters Hill-road, Woolwich, S.E.18. HOUSE PHYSICIAN (pediatrics and infectious diseases). Vacant mid-January. Not pre-registration. The post is recognised for D.C.H. and entails routine ward and outpatient work including experience in the modern Infectious Diseases Unit and with neonates.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. SENIOR REGISTRAR for 3 half-days in the Dermatological Department. Previous experience in dermatology essential. Post now vacant. Hospital may be visited by direct appointment.

Application forms obtainable from and returnable to Group Secretary, Hospital Management Committee, at Central Middlesex Hospital, Park Royal, N.W.10, by 31st December, 1957.

CONNAUGHT HOSPITAL, Walthamstow, E.17. (123 Beds.) Applications are invited for the post of SECOND CASUALTY OFFICER with duties in the Department of Orthopædic and Traumatic Surgery (Senior House Officer grade). Recognised for F.R.C.S. Salary £819 10s. p.a. less £150 p.a. for board, lodging, &c.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

CONNAUGHT HOSPITAL, Walthamstow, E.17. (123 Beds.) Applications are invited for the post of CASUALTY OFFICER AND DEPUTY RESIDENT SURGICAL OFFICER (graded as Senior House Officer). Recognised for F.R.C.S. Salary £819 10s. p.a. less £150 p.a. for board, lodging, &c.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

HACKNEY GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the 12 months' resident appointment of SENIOR HOUSE OFFICER (anæsthetics), now vacant. Duties shared between German Hospital, E.8 (157 Beds—general), and The Mothers' Hospital (Salvation Army), E.5 (110 Beds—maternity), with residence at the German Hospital. The post offers experience in general surgical anæsthesia and is approved for the Diploma in Anæsthetics. Facilities for study provided.

Apply Group Secretary, Hackney Hospital, London, E.9, quoting GH/SHO.

HACKNEY HOSPITAL, London, E.9. (General—841 Beds.) OBSTETRIC HOUSE SURGEON, pre-registration. Resident post, vacant 1st February, 1958.

Apply Secretary, above address, by 3rd January, 1958.

HACKNEY HOSPITAL, London, E.9. (General—841 Beds.) HOUSE SURGEONS (2), pre-registration. Resident posts, vacant 16th January, 1958, and 1st February, 1958.

Apply Secretary, above address, by 3rd January, 1958.

HACKNEY HOSPITAL, London, E.9. (General—841 Beds.) HOUSE PHYSICIAN, pre-registration. Resident post, vacant 18th January, 1958.

Apply Secretary, above address, by 3rd January, 1958.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Whole-time NON-RESIDENT REGISTRAR (radiotherapy) required as soon as possible.

Applications, stating age, qualifications, experience, names 2 referees, to Secretary, Board of Governors, by 4th January.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Whole-time NON-RESIDENT REGISTRAR (anæsthetics) required as soon as possible.

Applications, stating age, qualifications, experience, names of 2 referees, to Secretary, The Board of Governors, The Hammersmith, West London and St. Mark's Hospitals, Ducane-road, W.12, by 1st January.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL OF LONDON AND THE UNIVERSITY COLLEGE HOSPITAL OF THE WEST INDIES. Joint appointment. Whole-time REGISTRAR (anæsthetics) required. Post tenable in the first place at Hammersmith Hospital (non-resident), then 1 year at the University College Hospital of the West Indies (flat available), returning to Hammersmith Hospital for final period. Return passage paid to West Indies for 1 person only.

Salary :—
Whilst at Hammersmith Hospital, £935 or £1061 10s.
Whilst at University College Hospital of the West Indies, £1200 minimum.

Detailed applications, stating age, qualifications, experience, names of 2 referees, should reach the Secretary, The Board of Governors, The Hammersmith, West London and St. Mark's Hospitals, Ducane-road, London, W.12 (from whom further details concerning this appointment can be obtained) by 1st January.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, N.21. HOUSE SURGEON required 50 surgical beds, new operating theatre, Outpatient and Casualty Departments. Preference given to applicants seeking pre-registration post under Medical Act, 1950.

Applications, with copies of 3 testimonials and name and address of 1 referee, to Hospital Secretary.

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the following posts in the Department of Anæsthetics becoming vacant on the dates stated:—

REGISTRAR, 1st March, 1958.
REGISTRAR, 1st April, 1958.
JUNIOR REGISTRAR, 1st March, 1958.

Applications (12 copies), giving the names and addresses of 3 referees in the case of the Registrar appointments and for the Junior Registrar post 6 copies of application, together with 6 copies of 3 recent testimonials, should be received by the undersigned by 31st December, 1957.

H. BRIERLEY, House Governor.

LAMBETH HOSPITAL, Brook-drive, S.E.11. South West METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners for the post of SURGICAL REGISTRAR for general surgery and genito-urinary work. The appointment is normally for 2 years, but is subject to review at the end of 1 year. The post is resident or non-resident but, if the latter, the successful applicant will be required to sleep in on nights on duty.

Forms of application from the Group Secretary, Lambeth Group Hospital Management Committee, Renfrew-road, S.E.11, to be returned not later than 4th January, 1958.

LAMBETH HOSPITAL, Brook-drive, S.E.11. Applications are invited from pre-registration and registered medical practitioners for the post of RESIDENT HOUSE PHYSICIAN. Vacant 9th January, 1958.

Application forms from the Secretary. A self-addressed envelope should be enclosed.

MARIE CURIE HOSPITAL, 66, Fitzjohn's-avenue, London, N.W.3. HAREFIELD AND NORTHWOOD GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the non-resident appointment of JUNIOR HOSPITAL MEDICAL OFFICER at the above 50-bedded radiotherapy hospital.

Applications, giving full details of experience and qualifications, together with the names of 2 referees, to be sent to the Administrative Officer by 31st December, 1957.

MIDDLESEX HOSPITAL and at THE NATIONAL HOSPITALS FOR NERVOUS DISEASES (MAIDA VALE HOSPITAL). Applications are invited for the appointment of NEURO-SURGICAL REGISTRAR to work at the above Hospitals (half-time at each hospital) for a period of 1 year in the first instance.

Written applications, with names of 2 referees, to the Secretary to the Board of Governors, Maida Vale Hospital, London, W.9, not later than 4th January, 1958.

MILDMAY MISSION HOSPITAL, Austin-street, London, E.2. Applications are invited for the pre-registration post of RESIDENT HOUSE PHYSICIAN/CASUALTY OFFICER, vacant on 13th January, 1958. Candidates should be in sympathy with the evangelical Christian aims of the Hospital.

Applications and references to be addressed to the Medical Superintendent as soon as possible.

NELSON HOSPITAL, Kingston-road, Merton, S.W.20. HOUSE SURGEON (resident) (not pre-registration). Post vacant now. Recognised for F.R.C.S.

Applications, stating age, qualifications, &c., with the names and addresses of 2 referees, should be sent to the Secretary at above address.

ROYAL NORTHERN HOSPITAL, Holloway, London, N.7. (279 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. CASUALTY REGISTRAR (resident) required at above Hospital. Experience in practical operative surgery an advantage. Recognised post for F.R.C.S. Candidates may visit the hospital by direct appointment.

Application forms obtainable from and returnable to the Secretary, Royal Northern Hospital, N.7, by 4th January, 1958.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for a whole-time appointment as RESIDENT MEDICAL OFFICER to fill a vacancy in the approved establishment at the Seamen's Group of hospitals. The successful candidate will be required to reside at the Dreadnought Seamen's Hospital, Greenwich, S.E.10. The salary will be £1061 10s. p.a. and the appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales) and will be for 1 year in the first instance, renewable for a further year.

Applications, giving particulars of age, qualifications and experience, with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 4th January, 1958.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as whole-time REGISTRAR in Orthopædic Surgery to fill a vacancy in the approved trainee establishment at the Seamen's Group of hospitals. The successful candidate will be required to reside at the Albert Dock Traumatic and Orthopædic Hospital, Ainwick-road, E.16. A furnished self-contained flat is available. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales) and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience, with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, London, W.1, not later than 4th January, 1958.

ST. BARTHOLOMEW'S HOSPITAL, E.C.1. Applications are invited for the post of REGISTRAR in the Obstetric and Gynæcological Department. The post is tenable from 1st April, 1958, and candidates should preferably be in possession of the M.R.C.O.G. The appointment will be for 1 year in the first instance, with possible re-election to a second year.

Applications should be submitted to the undersigned with the next 21 days, together with the names of 2 referees.

C. C. CARUS-WILSON, Clerk to the Governors.

ST. LEONARD'S HOSPITAL, Nuttall-street, London, N.1. (Acute general—192 Beds.) Applications are invited from registered or provisionally registered medical practitioners for the post of HOUSE SURGEON.

Applications, with copies of 2 testimonials, to the Hospital Secretary by 3rd January, 1958.

ST. THOMAS'S HOSPITAL, London, S.E.1. Obstetric HOUSE PHYSICIAN at the General Lying-in Hospital, for 6 months from 4th March, 1958. Resident. Approved service for M.R.C.O.G.

Applications from fully registered medical practitioners only to Clerk of the Governors by 3rd January, 1958, naming 2 referees.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.1. There will be a vacancy on 8th March, 1958, for an ASSISTANT MEDICAL REGISTRAR (Registrar grade).

Further particulars and forms of application, which must be returned not later than 6th January, 1958, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.1. There will be a vacancy on 6th March, 1958, for an ASSISTANT RESIDENT MEDICAL OFFICER (grade Senior House Officer) at the Country Branch Hospital, Tadworth, Surrey (101 Beds).

Further particulars and forms of application, which must be returned not later than 6th January, 1958, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

UNIVERSITY COLLEGE HOSPITAL, Gower-street, W.C.1. Applications are invited for the post of REGISTRAR in the Dermatological Department for 1 year in the first instance from 1st April, 1958.

Applications to T. F. W. MACKEOWN, Administrator and Secretary, by 4th January, 1958.

WANSTEAD HOSPITAL, Hermon Hill, E.11. (191 Beds.) Applications are invited for the post of CASUALTY OFFICER (recognised for F.R.C.S.), graded Senior House Officer. Vacant 1st January, 1958. Salary £819 10s. p.a. less £150 p.a. for board, lodging, &c.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

WANSTEAD HOSPITAL, Hermon Hill, London, E.11. (191 Beds.) HOUSE SURGEON required. Recognised for F.R.C.S.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

WESTMINSTER HOSPITAL, St. John's-gardens, S.W.1. Applications invited for post of REGISTRAR to Department of Morbid Anatomy for 1 year in first instance from 3rd February, 1958. Some experience in morbid anatomy desirable.

Applications (5 copies), with names of 2 referees, to House Governor by 4th January.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (No. 10) HOSPITAL GROUP. Applications are invited from fully registered medical practitioners for the post of HOUSE OFFICER in the Geriatric Unit at above Hospital. This post, vacant 14th January, 1958, offers excellent scope for persons interested in this specialty, as the most modern methods of Geriatric treatment are employed.

Application forms from the Hospital Secretary, to be returned by 30th December, 1957.

ALTRINCHAM GENERAL HOSPITAL, Annexe and E.N.T. DEPARTMENT. (183 Beds.) SENIOR HOUSE OFFICER (surgical). This appointment affords excellent experience to suitably qualified candidates. Post recognised under F.R.C.S. regulations.

Applications, with names of 2 referees, to Group Secretary, North and Mid-Cheshire Hospital Management Committee, Sinderland-road, Altrincham.

AMERSHAM GENERAL HOSPITAL. Locum House PHYSICIAN required for 2 weeks, from 22nd December.

Apply Secretary.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGE-MENT COMMITTEE.

SENIOR HOUSE OFFICER (obstetrics/gynæcology) required at Ashton-under-Lyne General Hospital. Bed complement 75 obstetric and 26 gynæcology. Recognised for M.R.C.O.G. Vacant February, 1958.

HOUSE OFFICER (midwifery) required. Post recognised for D.Obst.R.C.O.G., vacant February, 1958. Preference given to pre-registration candidates.

Applications, with copies of 2 testimonials, to Group Secretary, General Hospital, Ashton-under-Lyne, Lancs.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGE-MENT COMMITTEE. 2 HOUSE PHYSICIANS required at Ashton-under-Lyne General Hospital. Vacant February, 1958. Preference given to pre-registration candidates.

Applications, with copies of 2 testimonials, to Group Secretary, General Hospital, Ashton-under-Lyne, Lancs.

AYLESBURY, BUCKINGHAMSHIRE. STOKE MANDE-VILLE HOSPITAL. Applications are invited for the post of SENIOR HOUSE PHYSICIAN (Senior Resident Medical Officer) for the Acute General Medicine Unit, which comprises 2 Registrars and 3 Resident House Physicians. The post is of Senior House Officer grade, and is vacant mid-January.

Applications, with copies of 3 recent testimonials, to the Administrative Officer by 27th December. (Interview on 3rd January.)

BARNSTAPLE. NORTH DEVON INFIRMARY. (105 Beds.) HOUSE SURGEON (pre-registration); vacant now. The Hospital serves a wide area of pleasant countryside and the post affords good opportunity to study excellent clinical material.

Apply to Group Secretary, 19, Alexandra-road, Barnstaple.

BISHOP AUCKLAND, Co. DURHAM. The General HOSPITAL. (350 Beds.) SOUTH WEST DURHAM HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN required. Fully registered practitioner or pre-registration candidate.

Apply, naming 2 referees, to K. G. T. LUXFORD, Group Secretary, at the above address.

BISHOP AUCKLAND. THE GENERAL HOSPITAL. SENIOR HOUSE OFFICER or JUNIOR HOSPITAL MEDICAL OFFICER ANÆSTHETIST required at the above Hospital. Grading according to qualifications and/or experience.

Applications, including names of 3 referees, to Group Secretary, South West Durham Hospital Management Committee, immediately.

BEDFORD GENERAL HOSPITAL. (430 Beds.) Applica-tions are invited for the following posts :—

HOUSE SURGEON post, vacant immediately. Pre- or post-registration ; recognised for F.R.C.S. Post offers exceptional opportunities for general experience in busy acute surgical units.

ORTHOPÆDIC HOUSE SURGEON post, vacant immediately. Pre- or post-registration ; recognised for F.R.C.S. Post offers wide experience in a busy specialist orthopædic and traumatic unit.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 Beds.) HOUSE PHYSICIAN (House Officer or Senior House Officer grading according to experience).

Apply Group Secretary.

BIRMINGHAM REGIONAL HOSPITAL BOARD AND UNITED BIRMINGHAM HOSPITALS. Whole-time SENIOR REGISTRAR in Radiodiagnosis. Duties at Coventry and Warwickshire Hospital and other hospitals in the Coventry Group (9 notional half-days) and United Birmingham Hospitals (2 notional half-days). D.M.R.D. essential. Non-resident.

Application forms from Secretary, Regional Hospital Board, 10, Augustus-road, Birmingham, 15, to be returned by 6th January.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

1. Birmingham (Selly Oak) Group, Oak Tree-lane, Birmingham, 29

REGISTRAR (orthopædic). Now vacant at Royal Orthopædic Hospital, Birmingham. F.R.C.S. desirable—experience in orthopædic surgery. Resident.

2. Wolverhampton Group. The Royal Hospital, Wolverhampton

REGISTRAR (ophthalmology) for Wolverhampton and Midland Counties Eye Infirmary. Experience in specialty essential—possession of D.O. preferable. Opportunities for wide clinical experience and studying. Married accommodation may shortly be available.

3. Coventry No. 20 Group. Coventry and Warwickshire Hospital, Coventry

REGISTRAR (pathology) for general duties at Nuneaton Hospitals and the Group Laboratory. (Recognised D.Path.). Non-resident.

Application forms from Group Secretaries to be returned by 30th December, 1957.

BIRMINGHAM, 29. SELLY OAK HOSPITAL. (Equipped beds 955.) Applications are invited for the post of SENIOR HOUSE OFFICER (pædiatrics). Recognised for D.C.H.

Applications, stating qualifications, experience and age, with copies of 3 testimonials, to the Medical Superintendent.

BIRMINGHAM. SOLIHULL HOSPITAL, Lode-lane, SOLIHULL. RESIDENT MEDICAL OFFICER (Senior House Officer). Vacant end of January. General hospital with 5 other resident medical officers.

Apply Medical Superintendent.

BIRMINGHAM. SOLIHULL HOSPITAL, Lode-lane, SOLIHULL. HOUSE PHYSICIAN (pre-registration). Vacant January. General hospital offering good experience. 5 other resident medical staff.

Applications, with names of 2 referees, to Medical Superintendent as soon as possible.

BIRMINGHAM. SOLIHULL HOSPITAL, Lode-lane, SOLIHULL. HOUSE SURGEON (pre-registration). Vacant January. General hospital offering good experience. 5 other resident medical staff.

Applications, with names of 2 referees, to Medical Superintendent immediately.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. Applications are invited for the appointment of SURGICAL REGISTRAR (Registrar grade) to the United Birmingham Hospitals. Candidates must have held a resident appointment and should hold at least a primary Fellowship qualification. Residency is desirable.

Forms of application from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Edgbaston, Birmingham, 15, to be returned by 28th December, 1957.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. THE BIRMINGHAM MATERNITY HOSPITAL. Applications are invited from registered medical practitioners for the post of RESIDENT OBSTETRIC HOUSE SURGEON, vacant 1st March, 1958. The appointment is recognised for the M.R.C.O.G. and D.Obst.R.C.O.G.

Application forms obtainable from the House Governor, the Birmingham and Midland Hospitals for Women, Showell Green-lane, Sparkhill, Birmingham, 11, to be returned not later than 4th January, 1958. G. A. PHALP, Secretary.

BOVEY TRACEY (near), SOUTH DEVON. HAWKMOOR CHEST HOSPITAL. (214 Beds, including thoracic surgery unit of 43.) There is a vacancy for a JUNIOR HOSPITAL MEDICAL OFFICER. A house is available for a married candidate.

Applications, stating age, qualifications, and experience, with names of referees, to be sent to the Medical Superintendent.

BRADFORD A AND B HOSPITAL MANAGEMENT COMMITTEES. JUNIOR HOUSE OFFICER required for Geriatric Admission Unit. Post vacant 1st February, 1958. Major portion of duties carried out at St. Luke's Hospital, Bradford.

Applications, stating age, nationality, qualifications and experience, and copies of testimonials, to the Secretary, Royal Infirmary, Bradford, Yorks.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. BURY GENERAL HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER in Casualty and Orthopædics. This post is recognised for the F.R.C.S.

Full details, including nationality, age, qualifications and experience, with the names of 2 referees, should be forwarded to H. WILKINSON, Group Secretary, Bury General Hospital, Bury, Lancs.

BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE.

Royal Infirmary, Blackburn

HOUSE SURGEONS (2) required for 25th January and 1st February, 1958. Posts recognised for F.R.C.S. and approved for pre-registration purposes.

Queen's Park Hospital, Blackburn

HOUSE SURGEON required for 1st February, 1958. Post recognised for F.R.C.S. and approved for pre-registration purposes.

Apply to Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

BOLTON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. GROUP LABORATORIES. RESIDENT PATHOLOGIST (Senior House Officer grade). Now vacant, tenable for 12 months and recognised for the Dip.Path.

Applications, stating age, nationality, qualifications, experience, and the names of 2 referees, to Group Secretary, The Royal Infirmary, Bolton.

BOLTON DISTRICT GENERAL HOSPITAL. (607 Beds, including 107 for obstetrics and 30 for gynæcology). RESIDENT HOUSE OFFICER for the Department of Obstetrics and Gynæcology. Vacant 1st February, tenable for 6 months and recognised under the pre-registration service scheme. Also recognised for M.R.C.O.G. and D.Obst.R.C.O.G.

Applications, stating age, nationality, qualifications, experience and the names of 2 referees, to Group Secretary, Bolton and District Hospital Management Committee, The Royal Infirmary, Bolton, not later than 2nd January, 1958.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, WESTBOURNE. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the immediate appointment of SENIOR HOUSE OFFICER (resident), for E.N.T. duties. The appointment is recognised for the D.L.O. diploma and facilities are provided for studying.

Applications to the Hospital Secretary, Royal Victoria Hospital, Shelley-road, Bournemouth.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road, BOSCOMBE. (494 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (orthopædics and casualty combined), resident or non-resident, required for the end of December. The post is recognised for the F.R.C.S. examination and is normally tenable for 12 months. The Unit consists of a Registrar and 2 Senior House Officers with an additional Senior House Officer during the summer months.

Applications to the Hospital Secretary.

BRECHIN, ANGUS. STRACATHRO HOSPITAL. Applications are invited from medical practitioners of 2 years' standing for the post of SENIOR HOUSE OFFICER to the area geriatric units at Stracathro Hospital and Brechin Infirmary, which becomes vacant on 1st January, 1958. The unit, comprising some 140 Beds, undertakes active treatment and rehabilitation under the direction of the Regional Consultant in Geriatrics. Salary scale £819 10s. p.a., less £150 for residential emoluments.

Applications, accompanied by 3 recent testimonials, or naming 3 referees, should be addressed to the Group Medical Superintendent at Stracathro Hospital.

BRISTOL. COSSHAM AND FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. Applications invited for post of SENIOR HOUSE OFFICER in the Regional Department of Thoracic Surgery (100 Beds) at Frenchay Hospital, Bristol. The work provides experience in all branches of cardiac, œsophageal and pulmonary surgery and the appointment is recognised for the Fellowship examinations of the Royal College of Surgeons.

Applications, stating age and experience, and naming 2 referees, to be submitted to the Group Secretary.

BRIGHTON GENERAL HOSPITAL. Applications are invited for the appointment of HOUSE SURGEON (recognised for F.R.C.S.) to the General Surgical Unit (60 Beds). The post will be vacant on the 1st February, 1958. Salary in accordance with national scale. The post is recognised as a pre-registration appointment.

Applications, stating age, qualifications, experience, and giving the names of 2 referees, should be sent to the Physician-Superintendent, Brighton General Hospital, Elm-grove, Brighton, 7.

BRIGHTON. ROYAL ALEXANDRA HOSPITAL FOR SICK CHILDREN, Dyke-road. (130 Beds.) BRIGHTON AND LEWES HOSPITAL MANAGEMENT COMMITTEE. Vacancies for HOUSE PHYSICIAN and HOUSE SURGEON for 6 months from 17th January and 14th February, 1958, respectively. Both posts offer wide experience in pædiatrics and are recognised for D.C.H. That of House Surgeon is open to pre-registration candidates.

Applications, stating age, nationality, qualifications and experience, together with copies of recent testimonials, to be sent to the Administrative Officer as soon as possible.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (314 Beds.) RESIDENT ANÆSTHETIST (Senior House Officer grade) required for 1 year with interchange of duties, by agreement, at the Brighton General Hospital and other specialised units within the Brighton and Lewes Group. Vacant 21st December. Post recognised for F.F.A.R.C.S., and D.A.

Applications, stating age, nationality and experience, and naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. A Full-time Locum REGISTRAR in Orthopædic Surgery required from 1st January, 1958, for approximately 2 months (preferably resident).

Applications, stating age, qualifications, experience, &c., with the names and addresses of 2 referees, to be forwarded immediately to the Group Secretary, Brighton and Lewes Hospital Management Committee, Royal Sussex County Hospital, Brighton.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. SENIOR CASUALTY OFFICER (Junior Hospital Medical Officer), non-resident, required mid-December, at the above Hospital. Recognised for F.R.C.S.

Applications as locum or for permanent post, stating usual particulars and the names of 2 referees, to the Administrative Officer.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (314 Beds.) 2 CASUALTY HOUSE SURGEONS required 28th December and 22nd January. Duties include work in orthopædic and traumatic unit. Recognised for pre-registration and F.R.C.S.

Applications, stating usual particulars, and naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) The post of SENIOR HOUSE PHYSICIAN will be vacant at Stodmarsh-road Annexe early in January, 1958; duties will include care of 30-Bedded unit of chest diseases, also work at the chest clinic and with the pneumoconiosis unit. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CARDIFF. THE UNITED CARDIFF HOSPITALS. Applications are invited for the appointment of SENIOR REGISTRAR or REGISTRAR to the Department of Physical Medicine in this Teaching Hospital group, where there are opportunities for postgraduate study.

Application forms are available from the Secretary to the Board, at the Cardiff Royal Infirmary, Newport-road, Cardiff, and should be returned by 4th January.

CARLUKE, LANARKSHIRE. LAW HOSPITAL. Applications are invited for the following posts:—

HOUSE OFFICER (orthopædic) (pre- or post-registration) for the 6 months commencing 1st February, 1958.

SENIOR HOUSE OFFICER (medical) for 1st February, 1958.

JUNIOR HOSPITAL MEDICAL OFFICER (orthopædics).

Applications, stating age, qualifications and previous experience, together with the names of 2 referees, should be submitted to the Group Medical Superintendent, Law Hospital, Carluke.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. (733 Beds.) ANÆSTHETIC REGISTRAR. The hospital is recognised for the F.F.A.R.C.S. and D.A. Post vacant 2nd March, 1958.

Application forms, returnable by 4th January, obtainable from the Group Secretary at above address.

CARSHALTON, SURREY. ST. HELIER HOSPITAL, Wrythe-lane. (733 Beds.) SENIOR MEDICAL REGISTRAR (whole-time). Applicants should have the M.R.C.P. Post vacant 8th March, 1958. Further information and facilities to visit the Hospital on application to the Physician-Superintendent.

Application forms, returnable by 4th January, obtainable from the Group Secretary at above address.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. 2 HOUSE PHYSICIANS (pre-registration posts). Vacant 10th and 26th January respectively.

Applications, stating age, experience and qualifications, with copies of recent testimonials or the names of 2 referees, should be sent to the Secretary at above address.

CASTLEFORD, NORMANTON AND DISTRICT HOSPITAL, Hightown, Castleford. RESIDENT SURGICAL OFFICER (Senior House Officer grade) required. Married accommodation available. Post vacant 1st January, 1958.

Applications as soon as possible to the Secretary, Pontefract and Castleford Hospital Management Committee, Great Northern House, Salter-row, Pontefract, Yorkshire.

CHESTER. BARROWMORE HOSPITAL, Great Barrow, CHESTER. Male SENIOR HOUSE OFFICER (medical) required. Salary £819 10s. p.a., less £150 for residence. The Hospital is modern and for the treatment of pulmonary tuberculosis. It contains a regional thoracic surgical unit and a general chest ward. Applications from ex-patients considered.

Inquiries and applications, stating names of 2 referees, to be sent to Physician-Superintendent.

CHESTERFIELD. SCARSDALE HOSPITAL. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER for Geriatric Unit and for duties at Penmore Hospital. Full Consultant services. Excellent scope for doctor interested in this specialty. House available on service tenancy.

Applications, giving full particulars, with names of 3 referees, to Group Secretary, Chesterfield Hospital Management Committee, at Chesterfield Royal Hospital.

CHESTER-LE-STREET, Co. DURHAM. GENERAL HOSPITAL. (204 Beds.) HOUSE SURGEON (general surgery). Approved pre-registration appointment, and recognised under the F.R.C.S. regulations. Post vacant 1st February, 1958.

Apply, with names and addresses of 2 referees, to Group Secretary, Dryburn Hospital, Durham.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botleys Park War Hospital). (430 Beds.) SENIOR HOUSE OFFICER ANÆSTHETIST required February, 1958. Appointment recognised for D.A. and F.F.A.R.C.S. Salary in accordance with terms and conditions of National Health Service.

Applications, together with names and addresses of referees, to Physician-Superintendent, St. Peter's Hospital, as soon as possible.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL. (430 Beds.) Applications are invited for the posts of

SENIOR MEDICAL REGISTRAR;

MEDICAL REGISTRAR;

which become vacant March, 1958. The Hospital may be visited by arrangement with the Physician-Superintendent.

Application forms can be obtained from, and should be returned by 1st January, 1958, to, the Group Secretary, Woking and Chertsey Hospital Management Committee, "Huntington", Guildford-road, Chertsey, Surrey.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botleys Park War Hospital). (430 Beds.) RESIDENT HOUSE SURGEON (Senior House Officer or Intern) required for Gynæcological (30 Beds) and E.N.T. (approximately 14 Beds) Departments. Salary in accordance with terms and conditions of National Health Service. Post vacant 1st February, 1958.

Applications, together with names and addresses of referees, to Physician-Superintendent, St. Peter's Hospital, as soon as possible.

CHELMSFORD AND ESSEX HOSPITAL. (161 Beds.) Applications are invited for the post of RESIDENT HOUSE SURGEON. Pre-registration post. The post offers good surgical experience. Recognised for the F.R.C.S.

Applications, together with 2 recent testimonials, to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELMSFORD AND ESSEX AND ST. JOHN'S HOSPITALS. Resident Locum ANÆSTHETIC REGISTRAR required.

Applications to Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford, Essex.

CHICHESTER. ST. RICHARD'S HOSPITAL. (400 Beds.) CHICHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE SURGEON (pre-registration), for 6 months only in the first instance. Post vacant 1st January, 1958. The man or woman appointed will work primarily in the surgical wards of the Hospital. Hospital recognised for F.R.C.S.

Applications, stating age, qualifications and experience, giving names of 2 persons from whom reference may be obtained, should be sent to the Surgeon-Superintendent.

COLCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for :—

Essex County Hospital, Colchester (185 Beds)

Post of HOUSE PHYSICIAN. First, second, third or pre-registration post, tenable for 6 months.

Essex County Hospital, Colchester (19 gynæcological beds), **Colchester Maternity Hospital** (22 obstetric beds)

Post of HOUSE OFFICER (Male or Female) (obstetric and gynæcological). First, second, third or pre-registration post, tenable for 6 months.

Black Notley Hospital, Braintree, Essex (516 Beds)

Post of HOUSE SURGEON. Includes duties in general surgical and gynæcological wards. Recognised for F.R.C.S.

Post of HOUSE PHYSICIAN. Includes duties in medical and pædiatric wards. First, second, third or pre-registration posts; tenable for 6 months.

Clacton and District Hospital, Clacton-on-Sea, Essex (58 Beds)

Post of SENIOR HOUSE OFFICER (Resident Surgical Officer). Post tenable for 1 year.

Applications, with copies of 3 testimonials, to Group Secretary, Colchester Group Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

COVENTRY AND WARWICKSHIRE HOSPITAL, COVENTRY. ASSISTANT PATHOLOGIST (Junior Hospital Medical Officer status) required for duties mainly at Group Laboratory. Recognised D.Path. Good opportunity for experience in all branches of specialty.

Applications, with full details and names of 2 referees, to Group Secretary, Coventry and Warwickshire Hospital, Coventry.

CREWE AND DISTRICT MEMORIAL HOSPITAL. (140 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (surgical), vacant 26th January, 1958, which is recognised by the Royal College of Surgeons for the F.R.C.S. examination. This hospital has recently had a new twin theatre suite, and a new large Casualty Department added. There are 7 residents and ample opportunity for gaining experience in operative surgery will be afforded to the right candidate. Salary and conditions in accordance with Whitley Council scale.

Applications, stating age, qualifications, &c., with names of 2 referees, to be sent to the Group Secretary, Barony Hospital, Nantwich, Cheshire, within 10 days after publication.

CROWTHORNE, BERKSHIRE. BROADMOOR INSTITUTION. (920 Beds for persons of unsound mind of criminal tendencies.) SENIOR REGISTRAR. House or quarters available.

Applications, naming 3 referees, to Medical Superintendent by 18th January, 1958. Candidates may visit Hospital by appointment.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT or NON-RESIDENT REGISTRAR (neurosurgery) required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fullwood-road, Sheffield, by 30th December, 1957, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

DEWSBURY, YORKSHIRE. THE GENERAL HOSPITAL. Applications are invited for the pre-registration post of HOUSE PHYSICIAN (general medicine and pædiatrics) which falls vacant on 1st February, 1958.

Applications, with full details, to the Administrative Officer at the Hospital.

DEWSBURY, YORKSHIRE. THE GENERAL HOSPITAL. Applications are invited for the immediate vacancy of HOUSE OFFICER (general surgery).

Applications, giving full details, to the Administrative Officer at the Hospital.

DORCHESTER. DORSET COUNTY HOSPITAL. (109 Beds.) HOUSE SURGEON required for resident, pre-registration post vacant mid-January and tenable for 6 months. Recognised for F.R.C.S. examinations.

Applications, stating age and qualifications, together with copy testimonials, to Group Secretary, West Dorset Hospital Management Committee, Damers-road, Dorchester, Dorset, immediately.

DONCASTER. WESTERN HOSPITAL. (Recognised under the Regulations for the D.Obst.R.C.O.G. and M.R.C.O.G. (obstetrical experience) and approved for pre-registration service under the Medical Act, 1950.) Applications are invited for the post of OBSTETRICAL HOUSE OFFICER (Senior House Officer or pre-registration post). Vacant late January.

Applications should be forwarded to the Group Secretary, Doncaster Hospital Management Committee, at Doncaster Royal Infirmary by 24th December.

DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL GROUP, BIRMINGHAM REGION.

The Guest Hospital, Dudley (154 Beds)

HOUSE OFFICER (medical), pre-registration. Post vacant 1st January, 1958.

SENIOR HOUSE OFFICER (surgical). Post vacant now.

HOUSE OFFICER (surgical), pre-registration. Post vacant now.

The Corbett Hospital, Stourbridge (114 Beds)

HOUSE OFFICER (surgical), pre-registration. Post vacant January, 1958.

Wordsley Hospital, near Stourbridge (478 Beds)

SENIOR HOUSE OFFICER (medical), pre-registration. Post vacant 27th January, 1958.

Apply Group Secretary, Guest Hospital, Dudley, Worcs.

DUMFRIES AND GALLOWAY ROYAL INFIRMARY, DUMFRIES. Applications are invited for SENIOR HOUSE OFFICER or HOUSE OFFICER post in the Casualty and Orthopædic Department. The post offers wide experience and is approved for pre-registration purposes.

Apply to Secretary at above address.

DURHAM. COUNTY HOSPITAL. (116 Beds.) Resident HOUSE SURGEON required in Orthopædics and Casualty. Post recognised for pre-registration purposes. This post offers facilities for good and varied experience in a busy orthopædic and accident hospital which serves a wide mining and industrial area.

Apply, giving age, experience and names of 2 referees, to the Group Secretary, Dryburn Hospital, Durham.

DURHAM. DRYBURN HOSPITAL. (303 Beds.) HOUSE PHYSICIAN for Pædiatric Unit of 42 Beds. Approved pre-registration appointment and recognised for the D.C.H. Post vacant 1st February, 1958.

HOUSE OFFICER (gynæcology). Post vacant 1st February, 1958. The person appointed may be considered for a further appointment of 6 months' duration in midwifery at the end of the first appointment.

Apply, with names and addresses of 2 referees, to Group Secretary, Dryburn Hospital, Durham.

EAST GRINSTEAD. QUEEN VICTORIA HOSPITAL. RESIDENT HOUSE OFFICER (Male or Female) required on 1st January, 1958, for General Hospital. Appointment for 6 months in first instance. Recognised for pre-registration purposes, and for F.R.C.S. examination.

Apply, stating age, experience, with names of 3 referees, to Hospital Secretary.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. Locum SENIOR HOUSE OFFICER required in the Casualty Department for the period 16th–30th January, 1958.

Apply immediately to Medical Director.

EDINBURGH. ROYAL INFIRMARY. Applications are invited for the post of RESIDENT HOUSE OFFICER in the E.N.T. Department for a period of 6 months from 1st February, 1958.

Apply by letter, stating age, qualifications and experience, if any, to Medical Superintendent.

EDINBURGH. WESTERN GENERAL HOSPITAL. SENIOR HOUSE OFFICER required for Department of Radiotherapy, commencing 1st January, 1958.

Applications, with names of 2 referees, to the Medical Superintendent, Western General Hospital, Edinburgh, 4.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE OFFICER (obstetrics and gynæcology) required 1st February. Pre-registration post. Recognised in obstetrics by the College for M.R.C.O.G. and D.Obst.R.C.O.G. purposes.

Applications, stating age, qualifications and experience, with copies of 2 recent testimonials, should be sent as soon as possible to Group Secretary at above address.

GLASGOW. HAWKHEAD (MENTAL) HOSPITAL, 510, Crookston-road, Glasgow, S.W.3. Applications are invited for the post of SENIOR HOUSE OFFICER in Psychiatry (Male or Female, resident or non-resident). The post offers wide experience and training in all aspects of psychiatry (inpatient and outpatient), and all modern methods of treatment are carried out. Recognised for D.P.M.

Applications, together with the names of 2 referees, should be forwarded as soon as possible to Physician-Superintendent at the above address.

GUILDFORD. ROYAL SURREY COUNTY HOSPITAL. RESIDENT HOUSE SURGEON required for General Surgery. Post is vacant on 13th January and tenable for 6 months. It is approved for pre-registration candidates and recognised for the F.R.C.S. examination.

Applications, with copies of 3 testimonials, should be sent to the Hospital Secretary as soon as possible.

HALIFAX. ROYAL HALIFAX INFIRMARY. House SURGEON for General Surgery required. Post vacant immediately.

Applications to the Group Secretary, Royal Halifax Infirmary, Halifax.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for the appointment of HOUSE SURGEON (general, gynæcology and obstetrics). First or second post. To commence as soon as possible. Pre-registration post; recognised under F.R.C.S. regulations.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HASTINGS. ST. HELEN'S HOSPITAL. (493 Beds.) HOUSE SURGEON required. Pre-registration post recognised for F.R.C.S. Modern theatre. Staff of 4. Vacant 16th January, 1958.

Applications to Hospital Administrator by 1st January.

HASTINGS AND ST. LEONARDS-ON-SEA. BUCHANAN HOSPITAL. (91 Beds.) (Obstetric, Gynæcological and Premature Baby Unit.) SENIOR HOUSE OFFICER required for Obstetric and Premature Baby Unit. Appointment, recognised for D.Obst.R.C.O.G., is vacant 17th January, 1958.

Apply, giving names and addresses of 3 referees, to Hospital Administrator.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. HOUSE SURGEON (pre-registration) required.

Applications, giving full details and 2 names for reference, should be sent to the Hospital Secretary as soon as possible.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. Locum SENIOR HOUSE OFFICER (paediatrics). Required 1–2 weeks commencing 28th December or later.

Applications to the Hospital Secretary.

HEXHAM GENERAL HOSPITAL, Northumberland. (304 Beds.) HOUSE SURGEONS (2) (general surgery, combined with orthopædics). Pre-registration posts. Applications will be considered from final-year students in anticipation of graduation and also from registered practitioners. Hospital recognised by Royal College of Surgeons. Large orthopædic unit providing excellent experience.

Applications, with names of 2 referees, to Group Secretary, General Hospital, Hexham, Northumberland.

HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) Applications are invited for the post of CASUALTY OFFICER. The post, which is resident, is recognised under the Fellowship regulations and will be graded either Junior Hospital Medical Officer or Senior House Officer according to experience. Duties terminate at 7 P.M. with 1 night weekly on call.

Applications for the appointment, which will be vacant on 23rd January, 1958, should be accompanied by copies of 3 recent testimonials and addressed to the undersigned.

H. J. JOHNSON, Group Secretary.

The Royal Infirmary, Huddersfield.

HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER in the E.N.T. Department of the Victoria Hospital for Sick Children and the Hull Royal Infirmary. The post, which is now vacant, is recognised for the F.R.C.S. and D.L.O.

Applications, with testimonials, should be sent to the Hospital Secretary, Victoria Hospital for Sick Children, Park-street, Hull.

HULL. KINGSTON GENERAL HOSPITAL. (419 Beds.) HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE PHYSICIAN. Duties in an active geriatric unit for the investigation and treatment of acute and long-term illness. Resident post.

Applications, with full particulars, to the Hospital Secretary.

ILFORD. KING GEORGE HOSPITAL. There will be a vacancy for a CASUALTY OFFICER at above Hospital on 27th January, 1958, at a salary of £819 10s. p.a., resident or non-resident. Senior House Officer grade. This post is recognised for the F.R.C.S.

Applications, giving full particulars and accompanied by testimonials, should be sent to the undersigned within seven days of the appearance of this advertisement.

H. F. HARRIS, Group Secretary, Ilford and Barking Group Hospital Management Committee.

King George Hospital, Ilford.

ILKLEY. MIDDLETON HOSPITAL. (430 Beds.) Resident JUNIOR HOSPITAL MEDICAL OFFICER required at the above Hospital. This appointment provides for experience in the specialties of tuberculosis and geriatrics.

Applications, stating age, nationality, qualifications and experience, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL (Anglesea-ROAD WING). (356 Beds.) Applications are invited for the post of HOUSE SURGEON to the Senior Consultant General Surgeon, vacant mid-January. The post is recognised for pre-registration and for the F.R.C.S. examinations.

Applications, with copies of recent testimonials, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL (Anglesea-ROAD WING). (356 Beds.) Applications are invited for 2 posts of HOUSE SURGEON to Consultant General Surgeons, both vacant mid-January. The posts are recognised for pre-registration and for the F.R.C.S. examinations.

Applications, with copies of recent testimonials, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL (Heath-road WING), IPSWICH. Applications invited for 2 posts of HOUSE SURGEON, pre-registration, to general surgeons. Posts become vacant on 7th and 17th January, 1958, and are recognised for F.R.C.S. examination.

Detailed applications, with copies of recent testimonials, to Hospital Secretary.

KETTERING AND DISTRICT GENERAL HOSPITAL. CASUALTY OFFICER (Senior House Officer). Recognised for F.R.C.S. The post, vacant December, 1957, offers wide experience of all traumatic conditions including fractures and some orthopaedic cases with charge of 30 beds.

Applications, accompanied by testimonials, to be sent to the Group Secretary, General Hospital, Kettering.

LEAMINGTON SPA. WARNEFORD GENERAL HOSPITAL. (197 Beds.) HOUSE SURGEON for Obstetric and Gynæcology Departments. Applications from fully registered practitioners and pre-registration applicants. Post vacant early January. Recognised for D.Obst.R.C.O.G.

Apply Hospital Secretary, together with copy testimonials.

LANARKSHIRE AREA OBSTETRICAL AND GYNÆCOLOGICAL STAFF. A vacancy exists for a SENIOR HOUSE OFFICER in Obstetrics and Gynæcology based at Bellshill Maternity Hospital. Applicants must have had at least 6 months' experience in obstetrics in a resident appointment and a similar period of experience in gynæcology is desirable. The post offers opportunities for wide experience in obstetrics and gynæcology and is suitable for training for those intending to specialise in these subjects. This post may also be considered under the special combined training scheme for general practitioners, in which case, after the occupant of the post has held it for a year, the appointment as a trainee assistant in general practice in the Lanarkshire area will be arranged for a further year. The salary is £819 10s. p.a.

Applications in writing, stating age and qualifications, with details of experience and the names of 3 referees, should be submitted to the Secretary, Board of Management, Hairmyres Hospital, East Kilbride, not later than 14 days from the date of publication of this advertisement.

LEEDS. THE UNITED LEEDS HOSPITALS. Applications are invited for the post of RESIDENT MEDICAL OFFICER at the General Infirmary at Leeds. The post is of Registrar status and will be tenable for 1 year from 1st January, 1958, in the first instance.

Applications, stating age, qualifications, previous posts with dates, and 3 names for reference, should be forwarded to the Sub-Dean, School of Medicine, Leeds, 2, by not later than 31st December, 1957.

LEEDS. THE UNITED LEEDS HOSPITALS. The General INFIRMARY AT LEEDS. Vacancy exists for REGISTRAR either as Trainee Radiologist or with D.M.R. Candidates with higher qualifications in medicine or surgery preferred. Terms and conditions of service for hospital medical and dental staffs apply. The appointment will be for 1 year in the first instance and renewable thereafter.

Applications, giving details of age, qualifications, previous posts, with dates, and 3 names for reference, should be sent to the Sub-Dean, School of Medicine, Leeds, 2, by not later than 27th December, 1957.

LEEDS. THE UNITED LEEDS HOSPITALS. The General INFIRMARY AT LEEDS. REGISTRAR in Urology required for a period of 1 year in the first instance. Renewable for second year. Post offers good experience either to candidates having already embarked upon training in general surgery or to those who wish to specialise in urology. Whitley conditions of service apply.

Applications, stating age, experience, qualifications, previous posts, with dates, and 3 names for reference, should be sent to the Sub-Dean, the Medical School, Leeds, 2, as soon as possible.

LEICESTER ROYAL INFIRMARY. (492 Beds. Recognised for training for F.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT SURGICAL REGISTRAR required 25th February. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 30th December, 1957, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

LEIGH INFIRMARY, Leigh. House Physician, pre-registration post, vacant early January.

Applications, with names of 2 referees, to Secretary, Wigan and Leigh Hospital Management Committee, Knowsley House, Wigan.

LINCOLN COUNTY HOSPITAL. (200 Beds.) Applications are invited from pre-registration candidates for appointments as HOUSE SURGEONS in January and February, 1958, for 6 months, to be followed, if satisfactory, by appointment as House Physician for a further 6 months.

Full particulars should be forwarded to—

R. W. HOWICK, Group Secretary,
Lincoln No. 1 Hospital Management Committee.

LLANELLY HOSPITAL, Llanelly. Glantawe Hospital MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the resident appointment of JUNIOR HOSPITAL MEDICAL OFFICER in the Medical Unit of the above Hospital.

Applications stating age, experience and qualifications, together with copies of 2 recent testimonials, should be sent to the Secretary of the Hospital. T. E. JONES, Group Secretary.

LUTON AND DUNSTABLE HOSPITAL. Children's ANNEXE. REGISTRAR to the Pædiatric Department of the Luton and Dunstable Hospital, required early February. Post resident or non-resident. Children's Annexe is separate from the parent hospital, taking medical and surgical children, and recognised for D.C.H. Applicants may visit by direct appointment (Tel. Luton 978).

Application form from Secretary, Luton and Hitchin Group Hospital Management Committee, St. Mary's Hospital, Luton, Beds.

MAIDSTONE. KENT COUNTY OPHTHALMIC AND AURAL HOSPITAL. (113 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE SURGEON in the Ophthalmic Department of the above Hospital. The Hospital is recognised by the Examining Board for the F.R.C.S. and the D.O. Salary £819 10s. a year less £150 a year for residential emoluments.

Applications should be forwarded to the Administrative Officer, Kent County Ophthalmic and Aural Hospital, Church-street, Maidstone.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE PHYSICIAN. 6 months' appointment. Salary at the rate of £467 10s.–£577 10s. A deduction at the rate of £125 a year is made for board and lodging, and other services provided.

Applications should be forwarded, as soon as possible, to the Administrative Officer at the Hospital.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE SURGEON. 6 months' appointment. Post vacant mid-January, 1958. Salary at the rate of £467 10s.–£577 10s. A deduction at the rate of £125 a year is made for board and lodging, and other services provided.

Applications should be forwarded, as soon as possible, to the Administrative Officer at the Hospital.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. CASUALTY OFFICER (Senior House Officer). Recognised for F.R.C.S. Salary £819 10s. p.a. less £150 p.a. for board and lodging. Post vacant February, 1958.

Applications to the Administrative Officer at the Hospital.

MANCHESTER REGIONAL HOSPITAL BOARD. Salford HOSPITAL MANAGEMENT COMMITTEE. HOPE HOSPITAL, SALFORD, 6. SURGICAL REGISTRAR required at the above Hospital. Post vacant 1st March, 1958. A busy general hospital offering excellent experience, recognised for F.R.C.S.

Applications, together with names and addresses of 2 referees, to be sent to Group Secretary, Salford Royal Hospital, Salford, 3, before 28th December, 1957.

MANCHESTER REGIONAL HOSPITAL BOARD. Salford HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for post of REGISTRAR in Surgery (Resident Surgical Officer) at Salford Royal Hospital. Previous experience in surgery essential, F.R.C.S. or higher surgical qualifications desirable.

Applications, together with names of 2 referees, to be sent to Group Secretary, Salford Royal Hospital, Salford, 3, before 4th January, 1958.

MANCHESTER REGIONAL HOSPITAL BOARD. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of REGISTRAR in Radiotherapy at the Christie Hospital and Holt Radium Institute, Manchester. Candidates must hold either the Diploma in Radiotherapy or an F.R.C.S. or M.R.C.P.

Applications, with full details, to be forwarded to the Group Secretary, Withington Hospital, Manchester, immediately.

MANCHESTER REGIONAL HOSPITAL BOARD and the UNITED MANCHESTER HOSPITALS. SENIOR REGISTRAR in Radiology, with initial duties in the North Manchester Group of hospitals (mainly at Crumpsall Hospital) and at Booth Hall (Children's) Hospital. The post is included in the Regional rotation scheme and it is expected that the person appointed will later transfer to the Manchester Royal Infirmary.

Forms of application from the Senior Administrative Medical Officer, Manchester Regional Hospital Board, Cheetwood-road, Manchester, 8, should be returned by 7th January, 1958.

MANCHESTER REGIONAL HOSPITAL BOARD. Senior REGISTRAR in Psychiatry in the Oldham and District Group of hospitals. Duties include attendance at Consultant Psychiatric Clinics and participation in treatment of inpatients and outpatients at hospitals in the Group. The person appointed may be required to undertake duties in other hospital centres during the course of his training.

Application forms from the Senior Administrative Medical Officer of the Board, Cheetwood-road, Manchester, 8, to be returned by 6th January, 1958.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for the following posts :—

RESIDENT SURGICAL OFFICER (Registrar grade).
SENIOR HOUSE OFFICER.
HOUSE OFFICER (pre-registration surgical post).

Application forms may be obtained from the undersigned.

H. R. NORTH, General Superintendent.

Manchester Royal Eye Hospital.

NEWCASTLE REGIONAL HOSPITAL BOARD. Regis-TRAR ANÆSTHETIST, whole-time, Hexham Group of hospitals. Hexham General (304 Beds); Dilston Hall Maternity (50 Beds). Post recognised for F.F.A.R.C.S. Married or single accommodation available.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Regis-TRAR OBSTETRICIAN AND GYNÆCOLOGIST, whole-time, Sunderland Group of hospitals—main hospitals Sunderland General (42 gynæcological beds), Maternity Hospital (81 obstetric beds). Post recognised for M.R.C.O.G. available 1st March, 1958. Single accommodation available.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Regis-TRAR ORTHOPÆDIC SURGEON, whole-time, Durham Group of hospitals—main hospital County Hospital, Durham (116 Beds). Single accommodation available.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Regis-TRAR PATHOLOGIST, whole-time, Durham Group of hospitals —main laboratory Dryburn Hospital. Post suitable for pre-membership candidate, or for one taking up pathology as a career.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Regis-TRAR RADIOTHERAPIST, whole-time, Regional Radiotherapy Service—main hospital Shotley Bridge General (533 Beds). Single accommodation available.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Locum REGISTRAR SURGEON, whole-time, required at Royal Infirmary, Sunderland, for 3 months from 1st January, 1958.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne 6, immediately.

NEWCASTLE REGIONAL HOSPITAL BOARD AND UNITED NEWCASTLE UPON TYNE HOSPITALS. SENIOR MEDICAL REGISTRAR. Whole-time joint appointment. The appointee will be attached to Clinical Team No. 1 at the Newcastle General Hospital (850 Beds) for the first year.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne 6, by 11th January, 1958.

NORTHAMPTON GENERAL HOSPITAL. (500 Beds.) Vacancy 1st February, 1958, for SENIOR HOUSE OFFICER, E.N.T. Department. Recognised for F.R.C.S. and for D.L.O. Appointment to 30th September, 1958, in first instance.

Applications as soon as possible to S. G. HILL, Superintendent.

NORTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD. Supernumerary SENIOR REGISTRAR in Thoracic Surgery, Harefield Hospital, Harefield, Middlesex. (616 Beds, including 86 for thoracic surgery, 430 for tuberculosis, and 100 for general medicine and surgery.) Applications are invited from practitioners from overseas (particularly the Commonwealth) with considerable experience in general surgery, who wish to have a period of training in thoracic surgery in England, with the intention of returning subsequently to their own country. Training may include a period spent at Clare Hall Hospital, South Mimms. Appointment in the first instance for 1 year, with eligibility for 1 further year. Resident accommodation available, but appropriate deduction will be made. Hospital may be visited by direct appointment if practicable.

Application forms obtainable from and returnable to Group Secretary, Harefield and Northwood Group Hospital Management Committee, Mount Vernon Hospital, Northwood, Middlesex, by 28th December, 1957.

NORWICH. NORFOLK AND NORWICH HOSPITAL. Applications are invited for the following appointments vacant 1st February, 1958. All are pre-registration posts.

(1) **Norfolk and Norwich Hospital, Norwich**

HOUSE PHYSICIAN (2) (Male or Female). Duties entirely general medical.

HOUSE SURGEON (Male or Female). Post recognised for final F.R.C.S. examination requirements. Duties entirely general surgical.

JUNIOR CASUALTY OFFICER (Male or Female). 2 Casualty Officers employed in the Department.

OBSTETRIC HOUSE SURGEON (Male or Female). Post recognised for final D.Obst.R.C.O.G. examination requirements.

JUNIOR ORTHOPÆDIC HOUSE SURGEON (Male or Female). 2 Orthopædic House Officers employed in the Department.

(2) **Jenny Lind Hospital for Children, Norwich**

HOUSE PHYSICIAN (Male or Female) at this Hospital, which forms the entire Pædiatric Department of the United Norwich Hospitals. The duties are under the direct supervision of the Consultant Staff of the Norfolk and Norwich Hospital. Post recognised for D.C.H. examination requirements.

HOUSE SURGEON (Male or Female) at this Hospital, which forms the entire Pædiatric Department of the United Norwich Hospitals. The duties are under the direct supervision of the Consultant Staff of the Norfolk and Norwich Hospital.

(3) **West Norwich and Norwich Isolation Hospitals, Norwich**

HOUSE PHYSICIAN (3) (Male or Female). Duties include acute medical, geriatric and infectious diseases. The beds at these Units are under the control of the Consultant Physicians of the Norfolk and Norwich Hospital, and the successful candidate will be required to undertake general medical duties under their supervision.

(4) **West Norwich Hospital, Norwich**

HOUSE SURGEON (2) (Male or Female). Post recognised for final F.R.C.S. examination requirements. Duties general surgical and including burns and plastic work. The beds at this Hospital are under the control of the Consultant Staff of the Norfolk and Norwich Hospital.

(5) **Norfolk and Norwich Hospital, Norwich**

Applications are also invited for the following appointment vacant 1st February, 1958:—

SENIOR CASUALTY OFFICER AND HOUSE SURGEON to the Septic Block (Male or Female), Senior House Officer status. 2 Casualty Officers employed in the Department. Recognised for final F.R.C.S. examination requirements.

Membership of a Medical Defence Society is a condition of appointment.

Applications, giving full details with names of 2 referees, to Group Secretary, Hospital Management Committee, St. Stephen's road, Norwich, by 4th January, 1958.

NOTTINGHAM CITY AND NOTTINGHAM CHILD-REN'S HOSPITALS. SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT or NON-RESIDENT REGISTRAR (orthopædics) required from 1st January. Duties at Nottingham City Hospital (82 orthopædic beds) and Nottingham Children's Hospital (23 orthopædic beds). Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 30th December, 1957, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

NOTTINGHAM EYE HOSPITAL. 2 Senior House OFFICERS required, duties to commence about the middle of January. Salary and conditions of service in accordance with Ministry regulations. There is a flat available for 1 of the successful candidates.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. 2 Senior House OFFICERS (orthopædic and fracture) required (January and February, 1958). Post offers exceptional experience in traumatic surgery.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Senior House OFFICER (surgical) required on 25th January, 1958.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Resident pre-registration HOUSE SURGEONS required, 4th February, 5th February.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Senior House OFFICER (anæsthetics) required about 14th January, 1958. The post is recognised for the D.A. and the F.F.A.R.C.S. This is a busy general hospital, giving experience in all branches of surgery.

Applications, stating age, nationality, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

NOTTINGHAM. MAPPERLEY HOSPITAL. (1087 Beds. Recognised for D.P.M.) Whole-time REGISTRAR (psychiatry) required. Hospital quarters available. Facilities for postgraduate study in conjunction with Sheffield University available. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 30th December, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

OXFORD. UNITED OXFORD HOSPITALS. Applications invited for post of NON-RESIDENT REGISTRAR in E.N.T. Department of the Radcliffe Infirmary, for 1 year in the first instance, but eligible for extension to a second year, with effect from 1st February, 1958. Candidates should have passed the Primary examination for the F.R.C.S.

Applications, on forms obtainable from the Administrator, Radcliffe Infirmary, Oxford, should reach him not later than 31st December, 1957.

OXFORD REGIONAL HOSPITAL BOARD. Registrar in Orthopædics and Accident Surgery (non-resident) to the hospitals and clinics of the Aylesbury area. The appointment will be for 1 year and eligible for extension to a second year.

Applications, on forms obtainable from the Secretary, Registrar Committee, 43, Banbury-road, Oxford, should reach him by 11th January, 1958.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

(1) **Saint Mary's Hospital**

(*a*) Applications are invited for the appointment of SENIOR HOUSE OFFICER (medical), vacant now. Duties will be mainly in the acute medical wards and outpatients, but there will be some duties in the Geriatric Assessment Unit of 76 Beds. The appointment affords an opportunity of seeing large numbers of acute cases and is an excellent one for those studying for a higher medical qualification.

(*b*) Pædiatric (Pædiatric Unit of 53 Beds).

HOUSE PHYSICIAN. The post is recognised for candidates preparing for the D.C.H. Vacant 1st February, 1958.

(*c*) Surgery (130 surgical beds).

HOUSE OFFICERS (pre-registration). Vacant 30th January, 1958, 1st February, 1958, 9th February, 1958, 11th February, 1958.

(*d*) Medical (74 medical beds).

HOUSE OFFICERS (pre-registration). Vacant 31st January, 1958, 12th February, 1958.

(2) **Royal Portsmouth Hospital**

(*a*) Pædiatric and Medical (total of 30 Beds).

HOUSE OFFICER (pre-registration). Vacant 1st February, 1958.

(*b*) Orthopædic Department (104 Beds).

(i) SENIOR HOUSE OFFICER required. Vacant now.

(ii) HOUSE OFFICER (pre-registration). Vacant now.

(*c*) Medical (61 medical beds).

HOUSE OFFICERS (pre-registration). Vacant 19th January, 1958, 10th February, 1958.

(3) **Queen Alexandra Hospital**

(*a*) SENIOR HOUSE OFFICER (78 medical beds and 24 dermatology beds). General medicine and dermatology. Vacant 29th January, 1958.

(*b*) SENIOR HOUSE SURGEON (87 surgical beds). Vacant 1st January, 1958.

(*c*) HOUSE OFFICER. Vacant 12th February, 1958.

(*d*) HOUSE OFFICER (pre-registration). Vacant 1st February, 1958.

Applications, stating age, experience and qualifications, together with the names of 2 referees, should be forwarded as soon as possible to E. H. HURST.

St. Mary's Hospital, Milton-road, Portsmouth.

PONTYPRIDD (near). EAST GLAMORGAN HOSPITAL, CHURCH VILLAGE. (316 Beds and large Outpatient Department. Committee's Base Hospital serving population of 174,000. Recognised for D.Obst.R.C.O.G., F.R.C.S., D.C.H., F.F.A. R.C.S., D.A.)

SENIOR HOUSE OFFICER (obstetrics and gynæcology), to commence 13th February, 1958.

SENIOR HOUSE OFFICER (surgery), to commence 1st March, 1958.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent immediately to the Group Secretary, Pontypridd and Rhondda Hospital Management Committee, Courthouse-street, Pontypridd.

PLYMOUTH. MOUNT GOLD ORTHOPÆDIC HOS-PITAL. Applications are invited for the post of SENIOR HOUSE OFFICER for the Orthopædic and Fracture Service, centring on Mount Gold Orthopædic and associated hospitals. Post recognised by R.C.S.

Applications, stating age, qualifications with dates, &c., and with copies of 2 recent testimonials, to be forwarded to the Secretary, Mount Gold Hospital, Plymouth, within 14 days of this advertisement appearing.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL. Vacancies exist in the following department:—

SENIOR HOUSE OFFICER in Surgery, vacant 17th February, 1958. Recognised for the F.R.C.S.

HOUSE SURGEONS (pre-registration posts), vacancies now, 1st and 4th January, 1958. Recognised for the F.R.C.S. Greenbank Road Hospital.

In all cases send names of 3 referees to the Group Secretary, 7, Nelson-gardens, Stoke, Plymouth.

POOLE GENERAL HOSPITAL, Poole, Dorset. (320 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT ANÆSTHETIC REGISTRAR. The post, which becomes vacant on 21st December, 1957, and is tenable for 1 year in the first instance, is recognised for the D.A. and the F.F.A.R.C.S. A furnished flat is available.

Forms of application obtainable from the Group Secretary, Hospital Management Committee Office, Royal Victoria Hospital, Gloucester-road, Boscombe, should be returned to him, duly completed, not later than Monday, 30th December, 1957.

RADCLIFFE-ON-TRENT. SAXONDALE HOSPITAL. (938 Beds. Recognised for D.P.M.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (psychiatry) required. Facilities for postgraduate study in conjunction with Sheffield University available. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 30th December, 1957, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER for E.N.T. Department, Royal Berkshire Hospital, Reading (40 Beds). Post recognised for D.L.O.

Applications, stating age, nationality, experience and qualifications, together with names of 2 referees, should be sent to Group Secretary, 3, Craven-road, Reading.

ROCHDALE AND DISTRICT HOSPITAL MANAGE-MENT COMMITTEE. HOUSE PHYSICIANS (pre- or post-registration) required for Birch Hill Hospital. Post offers wide experience in general medicine. Staff of 5 residents in the Medical Department.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale.

ROCHDALE AND DISTRICT HOSPITAL MANAGE-MENT COMMITTEE. Applications are invited for the appointment of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade) in the Department of Pathology of the Rochdale Group of hospitals. A new Department of Pathology is now being completed and will be opened early next year. The duties will consist mainly of clinical pathology, also general and emergency work and supervision of the blood banks. Previous pathology experience is not essential. Post vacant end of year.

Applications, giving usual particulars and names and addresses of 2 referees, to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancashire, at once.

ROCHDALE AND DISTRICT HOSPITAL MANAGE-MENT COMMITTEE. HOUSE SURGEON (resident) required early January, 1958. Pre- or post-registration doctors eligible for this post which is recognised for 6 months' F.R.C.S. experience.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale.

RYDE. ROYAL I.W. COUNTY HOSPITAL. Isle of WIGHT GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN required (pre-registration post). Vacant 1st February, 1958.

Applications, with names of 2 referees, to Hospital Secretary not later than 28th December, 1957.

RYDE. ROYAL I.W. COUNTY HOSPITAL. Isle of WIGHT GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. CASUALTY AND ORTHOPÆDIC OFFICER required end January, 1958, at the above Hospital, either as Registrar (£935–£1061 10s.) or as Junior Hospital Medical Officer (£852 10s.–£55–£1182 10s.). The appointment is resident, married or single accommodation being available, and is recognised for the F.R.C.S.

Forms of application may be obtained from the Group Secretary, Hospital Management Committee, Clatterford House, Carisbrooke, I.W., and should be returned not later than 10th January, 1958.

SALISBURY GENERAL HOSPITAL. Applications are invited for the appointment of RESIDENT HOUSE SURGEON/HOUSE PHYSICIAN to run consecutively in this order from 1st January, 1958, for a period of 6 months in each post. The post is open to pre-registration candidates.

Apply, naming 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SCUNTHORPE. WAR MEMORIAL HOSPITAL. House PHYSICIAN (1 of 2). Applications invited for pre-registration/Senior House Officer post, vacant late January. Modern Hospital with busy department including medicine, pædiatrics, skins, and eyes, with busy outpatient clinics offering good experience.

Applications, naming 2 referees, to Group Secretary, Scunthorpe Hospital Management Committee.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. HOUSE SURGEON required, 1 of 2. Pre-registration post.

Applications, with names of 2 referees, to Secretary.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. Pædiatrics. Dundee General Hospitals. Applications are invited for the post of SENIOR REGISTRAR in Pædiatrics at Dundee Royal Infirmary (534 Beds) and Maryfield Hospital, Dundee (370 Beds), the main teaching hospitals associated with the University of St. Andrews. The duties will include teaching of undergraduates. Salary and conditions of service in accordance with national agreement.

Further particulars and forms of application from the Secretary to the Board, "Braeknowe", 430, Blackness-road, Dundee, with whom applications must be lodged not later than 4th January, 1958.

SHEFFIELD, S. CITY GENERAL HOSPITAL. DEPARTMENT OF PATHOLOGY, GROUP LABORATORY. Applications are invited for the appointment of SENIOR HOUSE OFFICER (clinical pathology). Resident accommodation is available and optional. Opportunities for training in morbid anatomy, biochemistry, hæmatology and bacteriology. The work of this and the associated hospitals offers excellent experience to graduates who wish to make pathology their permanent career. The post is recognised for the D.Path.

Apply, giving details of age, qualifications, present and previous appointments with dates, and the names of 2 persons to whom reference may be made, to the Group Secretary, Nether Edge Hospital, Sheffield, 11.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. ROYAL INFIRMARY. Applications invited for the non-resident post of REGISTRAR in the Rupert Hallam Department of Dermatology at the above Hospital.

Applications stating age, qualifications and experience, with the names of 3 referees, should be sent to the Chief Administrative Officer, United Sheffield Hospitals, West-street, Sheffield, 1, not later than 4th January, 1958.

SHEFFIELD. WHARNCLIFFE HOSPITAL. (129 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time SURGICAL REGISTRAR with additional orthopædic duties required 8th February. Single accommodation available. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 30th December, 1957, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SHOREHAM-BY-SEA, SUSSEX. SOUTHLANDS HOSPITAL. (120 acute surgical, 50 orthopædic beds.) 2 HOUSE SURGEONS required for general surgical duties, pre- or post-registration. Both posts recognised by R.C.S. for Fellowship.

Applications to Secretary, Southlands Hospital, Shoreham-by-Sea. A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.

SHOREHAM-BY-SEA, SUSSEX. SOUTHLANDS HOSPITAL. Locum Tenens HOUSE SURGEON, general surgical duties, immediately.

Applications to Secretary, Southlands Hospital, Shoreham-by-Sea. A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.

SHOREHAM-BY-SEA, SUSSEX. SOUTHLANDS HOSPITAL. (120 acute surgical and 50 orthopædic beds.) CASUALTY OFFICER (Senior House Officer). Post recognised for casualty by R.C.S. Vacant 1st January. Duties in Casualty and Orthopædic Department. Non-resident (single accommodation available).

Applications to Secretary, Southlands Hospital, Shoreham-by-Sea. A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.

SHREWSBURY. EYE, EAR AND THROAT HOSPITAL. SENIOR HOUSE OFFICER (ophthalmic). Eye Unit, 35 Beds. Post recognised for the D.O.M.S. Vacant 9th February, 1958.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY/COPTHORNE HOSPITAL. (500 Beds.) HOUSE PHYSICIAN—pre-registration candidates eligible. Vacant 31st January, 1958.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY. CHILDREN'S UNIT. SENIOR HOUSE OFFICER or HOUSE OFFICER (pædiatric). Recognised for D.C.H. 6-month appointment. The Unit consists of medical, surgical and fever beds. Vacant mid-January, 1958. Married quarters available.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SKIPTON (near). GRASSINGTON HOSPITAL. (208 Beds.) SENIOR HOUSE OFFICER required for the above Hospital, which provides treatment for tuberculous patients, men and women. Accommodation available for single applicants.

Applications to Medical Superintendent.

SOUTHEND-ON-SEA. GENERAL HOSPITAL. Applications are invited for appointment as SENIOR HOUSE OFFICER to the Orthopædic and Fracture Department. Post vacant end of January, 1958. The Orthopædic and Fracture Department is the centre for reference of all cases from a large surrounding area, and the post offers excellent experience in all aspects of orthopædic and traumatic surgery under the supervision of and with instructions from the Consultant-in-charge. Post recognised for the F.R.C.S. Resident or non-resident.

Applications, stating age, qualifications and experience, together with copies of recent testimonials, should be sent to the undersigned by 30th December. J. C. FIELD, Secretary.

STORNOWAY. LEWIS HOSPITAL. Lews and Harris HOSPITALS BOARD OF MANAGEMENT. Applications are invited for the post of RESIDENT HOUSE PHYSICIAN at the above Hospital. The post, which becomes vacant on 1st February, 1958, is a pre-registration one and preference will be given to applicants with previous hospital experience.

Applications, together with copies of testimonials, should be sent immediately to Mr. IAN MACLEOD, Secretary and Finance Officer.

SOUTHAMPTON EYE HOSPITAL. (32 Beds. Recognised for D.O. Examination.) RESIDENT SENIOR HOUSE OFFICER required end December.

Applications, with copies of testimonials, should be forwarded as soon as possible to Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON GENERAL HOSPITAL. (474 Beds.) RESIDENT HOUSE SURGEON required. Pre-registration candidates eligible.

Applications, with copies of recent testimonials, should be forwarded to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (274 Beds.) RESIDENT HOUSE SURGEON required. Pre-registration candidates eligible.

Applications, with copies of recent testimonials, should be forwarded to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (274 Beds. Recognised for F.R.C.S.) ORTHOPÆDIC HOUSE SURGEON (post recognised for pre-registration service and tenable for 6 months). The Hospital is the centre to which all trauma from a large industrial town and port is directed, thus providing excellent experience in the treatment of traumatic conditions; patients with orthopædic conditions are drawn from a wide area.

Applications, with copies of testimonials, should be sent as soon as possible to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTH BRENT, DEVON. DIDWORTHY CHEST HOSPITAL. Applications are invited from registered medical practitioners for the post of ASSISTANT MEDICAL OFFICER (Junior Hospital Medical Officer grade) at the above Hospital. This is a Hospital of 128 Beds for the treatment of pulmonary tuberculosis and includes a major thoracic surgery unit. Unfurnished bungalow available on Hospital estate.

Applications, stating age, nationality and qualifications, together with names of 2 referees, should be sent, as soon as possible, to the Group Secretary, Plymouth Special Hospital Management Committee, 8, Nelson-gardens, Stoke, Plymouth.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Obstetrics and Gynæcology to fill a vacancy in the approved trainee establishment at the Canterbury and Isle of Thanet groups of hospitals. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England) and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, 11, Portland-place, W.1, not later than 4th January, 1958.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as REGISTRAR in Surgical Neurology at the Neuropsychiatric Unit at Hurstwood Park Hospital, Haywards Heath, Sussex. A similar appointment has already been made at the Regional Neurological/Neurosurgical Unit at the Brook Hospital and duties will rotate between the 2 appointments. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales) and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, London, W.1, not later than 4th January, 1958.

STOCKPORT INFIRMARY. Stockport and Buxton HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (non-resident Casualty Officer). Hours of duty: 8.30 A.M.–4.30 P.M. Monday–Friday; 8.30 A.M.–12 NOON Saturday. The post is recognised under F.R.C.S. regulations and would suit a candidate wishing to study for higher qualifications. It is vacant 1st January, 1958.

Applications, stating age, qualifications and experience, together with copies of 2 testimonials, to be addressed to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport, Cheshire.

STOKE-ON-TRENT. BUCKNALL HOSPITAL. (40 chest beds for children, 84 infectious, 24 pneumoconiosis, 124 chronic sick beds.) Applications are invited for post of RESIDENT JUNIOR HOSPITAL MEDICAL OFFICER, vacant 1st February. Married accommodation available. The person appointed will be associated with all departments of the Hospital and will be required to assist at the pneumoconiosis clinic.

Detailed applications, with copy testimonials, to Physician-Superintendent, at the Hospital.

SUNDERLAND. ROYAL INFIRMARY, Durham-road, SUNDERLAND. (300 Beds.) HOUSE OFFICER or SENIOR HOUSE OFFICER (Male) according to experience, required for duties in gynæcology and urological units. Post vacant 24th December. Provisionally registered practitioners may apply.

Apply to Hospital Secretary, giving the names and addresses of 2 referees.

SURBITON GENERAL HOSPITAL, Ewell-road, Surbiton, SURREY. RESIDENT JUNIOR HOUSE OFFICER (surgical) required. Pre-registration post. Duties include casualty work under direction of Resident Surgical Officer.

Applications, stating age, qualifications, nationality, and enclosing copies of 2 testimonials, to the Administrative Officer.

SUTTON AND CHEAM HOSPITAL, Cotswold-road, SUTTON, SURREY. (146 Beds.) HOUSE SURGEONS (post approved for pre-registration service). Vacant 1st February, 1958. Also Locum post 4th to 19th January, 1958.

Applications, with references, to the Secretary.

SUTTON-IN-ASHFIELD. KING'S MILL HOSPITAL. (258 Beds. Post recognised for F.R.C.S. examination.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT SURGICAL REGISTRAR required. Married accommodation available. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 30th December, 1957, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SWANSEA HOSPITAL, Swansea. (413 Beds.) Glantawe HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of CASUALTY OFFICER of Junior Hospital Medical Officer grade, at the above hospital. Resident or non-resident. Immediate vacancy.

Full particulars, stating age, qualifications and experience, together with the names of 2 referees, should be forwarded to the Secretary of the Hospital. T. E. JONES, Group Secretary.

SWANSEA HOSPITAL, Swansea. (413 Beds.) Glantawe HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE SURGEON at the above Hospital. The post is recognised for pre-registration purposes. The Hospital is a busy acute general hospital and offers excellent experience. Vacancy 1st February, 1958.

Applications, with full particulars and copies of 2 recent testimonials, should be sent to the Secretary of the Hospital.

T. E. JONES, Group Secretary.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. HOUSE SURGEON required for post vacant 21st January. Pre-registration post.

Applications, stating age, qualifications with dates, and copies of 2 testimonials, to Secretary.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. Applications invited for post of HOUSE PHYSICIAN to Special Unit for research in juvenile rheumatism. Post offers scope for those interested in research, pædiatrics, rheumatology or cardiology.

Applications, stating age, qualifications and experience, with copies of 2 testimonials, to Secretary.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. RESIDENT ANÆSTHETIC REGISTRAR required. Post recognised for F.F.A. R.C.S.

Application forms obtainable from and returnable to Secretary, Windsor Group Hospital Management Committee, Alma-road, Windsor, by 4th January.

TORQUAY. TORBAY HOSPITAL. (166 general beds.) RESIDENT HOUSE OFFICER (surgical), Male or Female, required approximately 15th December, 1957. Post recognised for F.R.C.S. and pre-registration purposes. There is a complement of 6 Resident House Officers.

Applications, stating qualifications, nationality and age, together with copy testimonials (quoting reference F.955/84), to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

TORQUAY. TORBAY HOSPITAL. Resident Casualty OFFICER (Senior House Officer status) required approximately 23rd December, 1957. There is a complement of 6 Resident House Officers.

Applications, stating qualifications, nationality, age (quoting ref. F.955/86), with copy testimonials, to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

TREDEGAR GENERAL HOSPITAL, Monmouth-SHIRE. RHYMNEY AND SIRHOWY VALLEYS HOSPITAL MANAGEMENT COMMITTEE. RESIDENT SURGICAL OFFICER (Senior House Officer or Junior Hospital Medical Officer grade according to experience) required for Surgical Unit at above Hospital. Duties are those of Assistant to General Surgeon; staff, includes House Surgeon. Commodious family flat.

Apply, with full particulars and stating names of 2 referees, to Secretary.

TUNBRIDGE WELLS. KENT AND SUSSEX HOS-PITAL. (303 Beds.) TUNBRIDGE WELLS GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (anæsthetics) required (Male or Female), resident. Vacant 13th January, 1958. Recognised D.A. and F.F.A. R.C.S.

Applications, giving age, qualifications and experience, with names of 2 referees, to Group Secretary, Sherwood Park, Pembury-road, Tunbridge Wells.

TUNBRIDGE WELLS (near). PEMBURY HOSPITAL, PEMBURY. Applications invited for appointment of SENIOR ORTHOPÆDIC HOUSE SURGEON AND CASUALTY OFFICER (Senior House Officer grade) to begin duties as soon as possible. Recognised F.R.C.S. (Eng.) and tenable for 1 year. Work includes treatment of long and short stay cases and traumatic surgery with large Outpatient and Fracture Clinics under 2 Consultants.

Apply, stating age, qualifications and experience, together with 3 testimonials, to Group Secretary, Sherwood Park, Pembury-road, Tunbridge Wells.

UXBRIDGE GROUP HOSPITAL MANAGEMENT COM-MITTEE. Applications invited for appointment of GERIATRIC REGISTRAR with established Geriatric Department under control of Consultant Geriatrician. Duties at St. John's Mount Pleasant and Hillingdon Hospitals. Post vacant 8th February, 1958.

Candidates may visit Hospitals by appointment with Group Secretary, from whom application forms are obtainable and returnable to, at The Furze, Pield Heath-road, Hillingdon, Middlesex, by 6th January.

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. (211 Beds.) ORTHOPÆDIC HOUSE SURGEON (with certain casualty duties) required. Post recognised for F.R.C.S. (Eng.) examination. Intermediate or senior post, depending on experience for orthopædic unit (30 Beds). The orthopædic service is in the charge of a Consultant and Registrar closely associated with a postgraduate teaching hospital.

Applications with copies of 2 testimonials to the Administrator.

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. (211 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital. This is a pre-registration post and is recognised for F.R.C.S. Salary according to the National Health Service scale.

Applications, with copies of recent testimonials, to the Administrator.

WALLASEY. VICTORIA GENERAL HOSPITAL. Applications are invited for the appointment of SENIOR HOUSE OFFICER in Pathology. The department is in the charge of a full-time Consultant Pathologist and is made up of separate Laboratories. Salary and conditions of service in accordance with Whitley Council agreements.

Applications, with names and addresses of 3 referees, to Group Secretary, North Wirral Hospital Management Committee, Victoria General Hospital, Wallasey.

WARRINGTON INFIRMARY. (172 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST (Male or Female), graded as Senior House Officer. The Hospital is recognised for the D.A. examination. Salary is £819 10s. p.a. less a deduction of £150 p.a. for residential emoluments.

Applications, stating qualifications and experience, should be sent to— HENRY L. BOOT, Group Secretary,

Warrington and District Hospital Management Committee. c/o General Hospital, Warrington, Lancs.

WESTON-SUPER-MARE GENERAL HOSPITAL. (107 Beds.) Applications are invited from registered medical practitioners for the pre-registration appointment (resident) of HOUSE PHYSICIAN, vacant 1st February, 1958.

Applications, stating age, qualifications, together with names and addresses of 2 referees, should be addressed to the Secretary, Weston-super-Mare Hospital Management Committee.

WESTON-SUPER-MARE GENERAL HOSPITAL. (107 Beds.) Applications are invited from registered medical practitioners for the pre-registration appointment (resident) of HOUSE SURGEON, vacant 1st February, 1958.

Applications, stating age, qualifications, together with names and addresses of 2 referees, should be addressed to the Secretary, Weston-super-Mare Hospital Management Committee.

WIGAN AND LEIGH HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER in General Surgery required for duty at Billinge Hospital, Orrell, near Wigan (370 Beds).

Applications, with names of 2 referees, to Secretary, Knowsley House, Wigan.

WIGAN AND LEIGH HOSPITAL MANAGEMENT COMMITTEE. BILLINGE HOSPITAL, near WIGAN. SENIOR HOUSE OFFICER in Psychiatry. The post offers good experience under Consultant Psychiatrist. Main centre at Billinge Hospital where there is an active psychiatric unit with modern treatment and over 300 admissions annually.

Applications, with names of 2 referees, to Secretary, Knowsley House, Wigan.

WIGAN AND LEIGH HOSPITAL MANAGEMENT COMMITTEE. ROYAL ALBERT EDWARD INFIRMARY, WIGAN. HOUSE SURGEON, pre-registration post, vacant early January.

Applications, with names of 2 referees, to Secretary, Knowsley House, Wigan.

WINDSOR. KING EDWARD VII HOSPITAL. House SURGEON in General Surgery required, Male or Female, for post vacant 18th January. Pre-registration post, recognised for F.R.C.S.

Applications, stating age, nationality, qualifications with dates, and copies of recent testimonials, to Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) HOUSE OFFICER (pre-registration) E.N.T. Department, recognised for the D.L.O. and F.R.C.S. examinations. Vacant 1st March.

Apply, giving age and qualifications, with copies of 2 testimonials, to the Hospital Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) Vacancies for Pre-registration HOUSE OFFICERS (medicine) occur on 2nd, 17th and 22nd January.

Please apply, with copies of 2 testimonials, to Hospital Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) Pre-registration HOUSE OFFICER (pædiatrics) required. Post recognised for D.C.H. Vacant 20th January, 1958.

Apply, giving age and qualifications, with copies of 2 testimonials, to the Hospital Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) Pre-registration HOUSE OFFICERS. Vacancies in surgery occur on 1st, 6th, 11th and 23rd January, 1958.

Apply, giving age and qualifications, with copies of 2 testimonials, to the Hospital Secretary.

OTTAWA CIVIC HOSPITAL, Ottawa, Canada (General— 800 Beds), invites applications to fill an appointment as RESIDENT in Medical Department from 1st July, 1958, to 30th June, 1959. This is a senior appointment for a man who proposes to write Fellowship examinations in Canada in the field of internal medicine and the appointment involves teaching graduate interns. Salary $200 per month, plus room and board.

Applications, stating age, qualifications, experience, and names of 2 referees, should be forwarded to Superintendent, Ottawa Civic Hospital, Ottawa, Canada.

MICHIGAN, U.S.A. OAKWOOD HOSPITAL, Dearborn, MICHIGAN. Applications are invited for 1 or 2-year approved GENERAL PRACTICE RESIDENCY in modern 234-Bed General Hospital 10 miles from Detroit. Excellent facilities. Hospital approved for exchange-visitor programme. Beginning monthly salary $250 if single, $300 if married. Free housing.

Apply: Director.

WORTHING HOSPITAL, Lyndhurst-road, Worthing, SUSSEX. Applications are invited from registered medical practitioners for the appointment, vacant in February, 1958, of RESIDENT CASUALTY OFFICER (Senior House Officer grade). The post is recognised for the revised Fellowship regulations in respect of the 6 months' training required by candidates for the Final Fellowship examination.

Applications, stating age, qualifications, nationality and experience, together with copies of 2 recent testimonials, to be forwarded to the Hospital Secretary as soon as possible.

A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.

B.W.I. UNIVERSITY COLLEGE HOSPITAL OF THE WEST INDIES. Applications are invited for the post of SENIOR REGISTRAR or REGISTRAR in the Division of Obstetrics and Gynæcology at the above named Teaching Hospital. This post which is resident is recognised for training for membership of the Royal College of Obstetricians and Gynæcologists. The post will be vacant on 1st January, 1958. The appointment will be for 1 year in the first instance. Salary is in the scale £900–£100–£1100 : £1200–£100–£1500 p.a. depending on qualifications and experience. Single accommodation and board may be provided at a deduction from salary at the rate of £145 p.a. or, if available, an unfurnished flat may be provided at a rental of 5% of salary. Passages by sea will be paid from the country of recruitment for 1 person only for this appointment.

Further information may be obtained from the Hospital Manager and Secretary, University College Hospital of the West Indies, Mona, Jamaica, B.W.I., to whom applications stating age, nationality, details of experience and qualifications, together with 3 recent testimonials or the names and addresses of 3 referees, should be sent not later than 31st December, 1957.

SOUTH AFRICA. THE ERNEST OPPENHEIMER HOSPITAL, WELKOM, SOUTH AFRICA. ANGLO AMERICAN CORPORATION OF SOUTH AFRICA, LIMITED (Incorporated in the Union of South Africa). Vacancies for SENIOR HOUSE OFFICERS at above 800-Bed industrial Hospital serving the gold mines of the Anglo American Corporation in the Orange Free State, South Africa. It deals with African patients only, and it is excellently equipped. It offers wide experience, particularly in orthopædics and traumatic surgery, and a general training in the whole field of industrial medicine. There are at present 4 vacancies for unmarried, Male, Senior House Officers, who would rotate in their duties, offering inclusive emoluments of approximately £100 per month. Salaries are reviewed annually and an average increment is approximately £120 p.a. South African income-tax is at a much lower rate than in the United Kingdom. The leave conditions are 30 days for each year of continuous service and, in addition, bonus leave is granted after 5 years of qualifying service. The appointments are subject to 30 days' notice of termination by either party. Successful candidates will be offered an assisted air passage to Welkom at a cost not exceeding £52, which is recoverable by monthly instalments of £5 per month and then refunded after 18 months' service. Residence at the hospital is essential, where the inclusive charge for board and lodging is £15 per month. There are excellent sports amenities in the hospital grounds as well as in the town. The town of Welkom (European population 25,000) has a good climate, and is within easy reach of Johannesburg and Bloemfontein.

Application forms can be obtained from Anglo American Corporation of South Africa, Limited, 40, Holborn-viaduct, London, E.C.1.

General Practice

For an ***Executive Council post*** *(England and Wales) apply on form E.C.16A obtainable from the council. Mark envelope "Vacancy."*

PORTSMOUTH, HAMPSHIRE. Applications invited for VACANCY, due to death, in south Portsmouth. Not a developing area. Classified "Intermediate." List at present 1450. Availability of residential and surgery accommodation uncertain. Apply on Form E.C.16A to the undersigned not later than 1st January, 1958.

A. R. GODDARD,
Clerk of the Portsmouth Executive Council.
66/74, Pearl Buildings, Commercial-road, Portsmouth.

Public Appointments

GLOUCESTERSHIRE COUNTY COUNCIL. Kingswood AND MANGOTSFIELD URBAN COUNCILS AND SODBURY AND WARMLEY RURAL COUNCILS. Applications are invited for the appointment of DIVISIONAL MEDICAL OFFICER OF HEALTH AND MEDICAL OFFICER OF HEALTH, which is whole-time and involves an approximately equal distribution of duties between the County Council and the 4 County District Councils. The salary is in accordance with the Medical Council of the Whitley Council for the Health Services and is £918 15s. rising by 1 annual increment of £31 5s. and 7 of £34 7s. 6d. to £1190 12s. 6d. in respect of County Council duties, and £975 rising by 4 annual increments of £27 10s. and 1 of £25 to £1110 in respect of District Council duties. The selected candidate will be required to provide a motorcar; travelling expenses payable on approved scale. The appointment is superannuable and the passing of a medical examination will be necessary. Applicants must hold a Diploma in Public Health and in respect of the County Council duties will act under the direction of the County Medical Officer of Health. The appointment will be subject to 3 calendar months' notice, in writing, on either side.

Applications, stating age, qualifications and previous experience, together with the names of 2 persons to whom reference may be made, should be sent to Clerk of the South Gloucestershire (M.O.H.) Joint Committee, The Council Offices, Hollow-road, Kingswood, Bristol, not later than 4th January, 1958.

GUY H. DAVIS,
Clerk of the County Council.
J. H. DEARNLEY,
Clerk of the South Gloucestershire (M.O.H.) Joint Committee.

ARGYLL COUNTY HOSPITAL. Applications are invited from registered medical practitioners for appointment of ASSISTANT MEDICAL OFFICER OF HEALTH at salary of £1050–£1475. Diploma in Public Health or equivalent qualification desirable.

Details of age, qualifications and experience and names of 3 referees, to be submitted to County Medical Officer, County Buildings, Oban, by 28th December, 1957.

A. D. JACKSON, County Clerk.

FACTORY DOCTORS. Factories Acts, 1937 and 1948. The following appointments as Appointed Factory Doctor are vacant. Apply to Chief Inspector of Factories, 19, St. James's-square, London, S.W.1.

District	*County*	*Latest date for receipt of applications*
CHESHAM	BUCKINGHAM	4TH JANUARY, 1958
TILLICOULTRY	CLACKMANNAN	4TH JANUARY, 1958
BRISTOL NORTH	GLOUCESTER	11TH JANUARY, 1958
SANQUHAR	DUMFRIES	11TH JANUARY, 1958

Miscellaneous

THE UNIVERSITY OF MANCHESTER. Applications are invited for the post of Assistant Medical Artist, who should be suitably qualified and who will work under the direction of the Medical Artist in the preparation of paintings, drawings, diagrams and similar works for members of the staff of the Medical School, both in the University and in the United Manchester Hospitals. Applicants should have had art training, together with at least 2 years' study and training at a University or Teaching Hospital, under a Medical Artist. Starting salary £450 p.a. rising by annual increments of £25 to £500 p.a. Duties to begin in January, 1958, or as early as possible thereafter.

Applications should be sent not later than 31st December, 1957, to the Registrar, the University, Manchester, 13, from whom further particulars may be obtained. Applicants should give the names of not more than 3 persons to whom reference may be made and may also submit copies of not more than 3 testimonials which will *not* be returned.

Principal M.O. required for a large group of tea gardens in north east India early May, 1958, for 6 months. Operating surgical experience required. Would suit man reading for final F.R.C.S. Furnished bungalow, servants and transport provided. Free return passages for doctor and wife.—Apply with full details, qualifications and experience and recent testimonials to Address No. 355, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Korea. Doctor (Female) required with pædiatric experience ; age preferably between 26 and 40. Contract 1 year renewable. Salary £1000 p.a. Maintenance equipment allowances and fares paid. 1 month's holiday per year. Duties in Pusan, Korea.—Apply Foreign Relief Secretary, Save the Children Fund, 12, Upper Belgrave-street, S.W.1. Telephone SLOane 9171.

Applications are invited for the appointment of a Medical Officer with a leading British company in British West Africa. Applicants should not be more than 35 years of age and should have had good all-round experience since qualifying. Salary will be in accordance with age, experience and qualifications, but will not be less than £1600 p.a. In addition there are family allowances, free passages to and from West Africa and free furnished quarters. Membership of pension fund is compulsory. Tours of duty will be about 18 months, followed by leave on full pay.

Applications, giving full details of experience, should be made to the Principal Medical Officer, Unilever House, Blackfriars, London, E.C.4.

South Australia. Medical Serologist required for Australian Red Cross Society Blood Transfusion Service, Adelaide. Salary £A2500 rising to £A3000.

Closing date for applications 10th January, 1958.

Inquiries to Agent General for South Australia, South Australia House, Marble Arch, London, W.1.

Required. Research worker holding degree in psychology, at the Burden Neurological Institute. Apply, stating academic status and research experience, to Director, Burden Institute, Stoke-lane, Stapleton, Bristol.

Histologic technicians, experienced. Excellent salary. —Write Congenital Heart Disease Research and Training Center, 629, South Wood-street, Chicago, Ill., U.S.A., giving full details.

"Alfona" is fat-free cow's milk to which has been added vegetable oils containing essential fatty acids suitable for atheroma cases.—Enquiries to ALFONAL, Shell-Mex House, Strand, London, W.C.2 (Telephone COV. 2211).

Doctors requiring applications, theses copied: Write to MANTON (WESTMINSTER) LTD., 98, Victoria-street, S.W.1 (VIC 0141), who are specialists.

Microscopes. Highest prices paid for good modern types. Send or bring your equipment for valuation.—WALLACE HEATON LTD., 127, New Bond-street, W.1.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimens of urine and £2 2s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

The British Journal of Medical Hypnotism. Quarterly, £2 2s. p.a.—Orders to the publishers, 4, Victoria-terrace, Hove, 3, Sussex.

Hanovia ultra-violet-infra red prescription lamp, model 7, as new. £18.—I. M. LENNARD, 55, Arundel-avenue, Morden, Surrey.

Early surgical and medical instruments. Advertiser, engaged on historical study of early surgical instrument makers, would be glad to hear from anyone possessing 18th or early 19th century instruments, catalogues, &c.—Address No. 357, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

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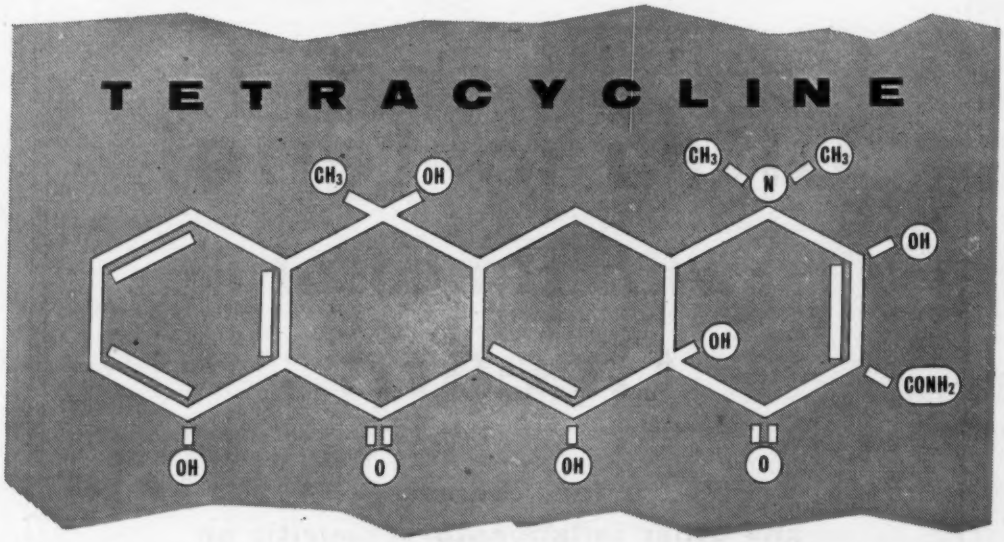

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The bactericide Bradosol prevents secondary infection which tends to develop during cortico-steroid therapy.

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